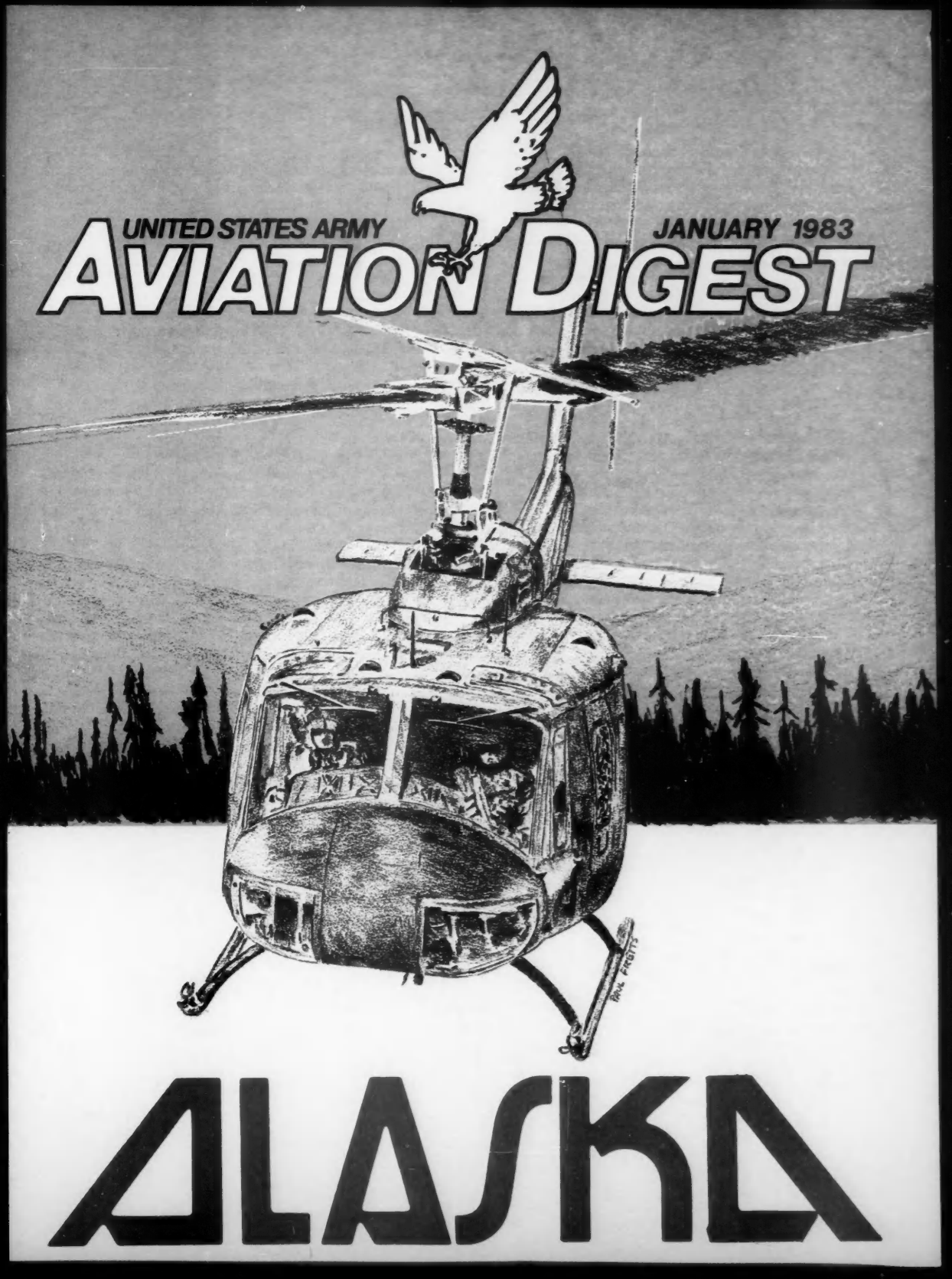
UNITED STATES ARMY
JANUARY 1983
AVIATION DIGEST
ALASKA

JANUARY 1983 • VOLUME 29 • NUMBER 1

★ **Brigadier General Ellis D. Parker**
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Honorable John O. Marsh Jr.
Secretary of the Army

Richard K. Tierney
Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

The *Digest* is an official Department of the Army periodical published monthly under the supervision of the Commanding General, U.S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army nor the U.S. Army Aviation Center. Photos are U.S. Army unless otherwise specified. Use of the masculine pronoun is intended to include both genders unless otherwise stated. Material may be reprinted provided credit is given to the *Digest* and to the author unless otherwise indicated.

Articles, photos, and items of interest on Army Aviation are invited. Direct communication is authorized to Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Fort Rucker, AL 36362. Manuscripts returned upon request.

This publication has been approved by The Adjutant General Headquarters Department of the Army, 10 September 1982, in accordance with Army Regulation 310-1.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1. Complete DA Form 12-5 and send directly to CDR, AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220. For any change in distribution requirements, initiate a revised DA Form 12-5.

National Guard and Army Reserve units under pinpoint distribution also should submit DA Form 12-5. Other National Guard units should submit requests through their state adjutant general.

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HAVING VISITED south of the border in recent issues and looked at Army Aviation operations in Panama, it is now only fitting that in the midst of winter we look "North to Alaska." As those who have served there well know, arctic operations, whether ground or air, are among the most hazardous and most difficult to accomplish of any in the world—unless one trains, equips and prepares properly for them. That is precisely what our aviation team in Alaska is so well known for doing, and this issue describes how.

In "Army Aviation, Alaska Style," Brigadier General Nathan C. Vail, commander, 172d Infantry Brigade, sets the stage by describing the chilling weather, minus 50 degrees Fahrenheit, trackless terrain and overall demanding environment in which the intrepid aviation members of his command live and work.

Those assigned to Troop E (AIR), 1st U.S. Cavalry, claim to be the "eyes and ears of the arctic soldier," according to CW3 Terry Bennett, CW3 (P) Robert Hawkins and 1LT Jerry Cornell. In "Air Cav in Alaska," the authors relate how the troop successfully provides aerial reconnaissance and security for the brigade, in spite of the harsh operating conditions.

Troop E's success is based on the same bulwark as that of the 172d Aviation Detachment—detailed preparation. CW4 Robert L. McFarland tells us about the 18 years of "Glacier Operations" the detachment has conducted "without accident or incident." A primary reason for that outstanding record, he notes, is the teamwork of the crews as they prepare for and accomplish their hazardous missions.

Some of the specific problems encountered in Alaska are SP4 Mary Henderson's topic in "Winter Aviation Techniques." She makes some interesting observations about precautions required for arctic aeromedical evacuation missions. Furthermore, her comments on the unique maintenance challenges incurred in the subzero temperatures might cause the less hardy crewchiefs to seek warmer climes.

Beyond the series on Alaska this month, we are continuing to develop the Light Helicopter Family (LHX) story begun in the last issue. You will find four splendid LHX articles on this exciting concept. One aspect, sometimes overlooked but perhaps one of the most critical, is that pertaining to logistical affordability. This question is well posed and answered herein by Army Aviation's chief logistician Mr. Joseph P. Cribbins in "Why Not an LHX?" He highlights how the "commonality, uniformity, standardization and interchangeability" of the LHX will ease the costs of supporting the aircraft. Mr. Cribbins places the LHX requirement in perspective with our existing aircraft systems and makes a strong case for the LHX family.

Still another "family" we need to know more about is CPT Donald R. Faint's subject in "The DEW Threat," and that means "directed energy weapons"—not the kind of "dew" that dampens the morning air. He writes that the laser and the nonnuclear electromagnetic pulse/radio frequency weapon are two DEWs that represent a significant threat to Army Aviation assets in future battles. This is an area with which few people are adequately conversant, and I strongly encourage you to read CPT Faint's splendid work on this rather complex subject.

For some time now, we have worked diligently on the revised AR 95-1, trying to give the Army and the aviation team a simple, clear, meaningful regulation on Army Aviation and we think we have it now—at least until circumstances dictate that changes be made. The new reg became effective this month, and some of the significant changes are discussed in the "DES Report to the Field." This is a splendid capsule view and well worth your time. Don't get caught short.

And while we constantly look to tomorrow as we consider changes in our doctrine and equipment, we must also be cognizant that there are many constants; some things simply never change. The letter on the outside back cover makes that point very well with respect to violations of safe flying practices that occurred 65 years ago during World War I over the trenches in France. The letter might well have been written by any one of us to the folks back home during the conflict in Vietnam. So I ask you to "read and heed" the wisdom of a young aviator of yesteryear—1918.

Finally, I could not conclude the opening of our first issue of the New Year without a very positive note on the tremendous support from the field on our Armywide effort to be ACCIDENT FREE IN '83. The record for first quarter, FY 1983, speaks for itself—a dramatic turnaround from last year's performance. Keep up the good work and KEEP 'EM FLYING—SAFELY!

Major General Carl H. McNair Jr.
Commander, U.S. Army Aviation Center
Fort Rucker, AL

Army Aviation ALASKA STYLE

Brigadier General Nathan C. Vail
Commander
172d Infantry Brigade (Alaska)
Fort Richardson, AK

TO SURVIVE A TOUR of duty as an Army aviator in Alaska, it is necessary to understand and appreciate the state's vastness, topography and climate.

Alaska is nearly one-fifth the size of the continental United States and contains more than 500,000 square miles covering five time zones. Alaska's 28,000 square miles of glaciers and ice fields are larger than any of the 10 smallest states or the District of Columbia. The Malispina Glacier, alone, is larger than Delaware.

Surrounded on three sides by water, the state's 6,640-mile coastline is five times larger than the combined coastlines of the "Lower-48" states. Alaska is a state where a pilot can fly 50 miles in one direction without catching a glance of a road, house or sign of human activity.

Alaska's vast land areas have an extremely limited transportation network. Less than 14,000 miles of road exist in the state, of which only about 2,300 miles are paved. There are 470 miles of single track railroad in Alaska. Because of the limited road and rail network, the Army depends heavily on air transportation to attain and sustain mission readiness.

During arctic winters, temperatures frequently reach minus 50 degrees Fahrenheit, and daylight is restricted to a few hours. Cold, strong winds, blowing snow and mountainous terrain are formidable obstacles. When ground units deploy, they depend on Army Aviation for life-sustaining resupply. Another weather-related phenomena is "ice fog," a condition resembling ordinary fog, but formed from ice crystals rather than moisture condensation. It is a man-made condition caused by vehicle or aircraft exhaust or by troop activity when temperatures are below minus 30 degrees Fahrenheit.

Arctic summers feature temperatures ranging from 65 to 90 degrees Fahrenheit during 22 hours of daylight. Problems of mobility are not alleviated by the arrival of warm weather. Powdered snow is now replaced with swampy, sponge-like muskeg, and mosquitos replace the biting cold of winter.

Alaska is famous for its winds: for strong and southerly or southwesterly winds called "Chinooks," and for sudden gusts, up to 115 miles per hour, called "Williwaws" which move about the mountains and the Aleutian Island chain.

Navigation by use of a compass is not totally reliable in Alaska. Magnetic forces cause a declination of up to 30 degrees.

Aviation units in Alaska which support the 172d Infantry Brigade include an aviation battalion, an air cavalry troop and two separate aviation detachments. The Alaska aviation articles in this issue of *Aviation Digest,* and the two next month tell the story of these units, how they are organized, trained and maintained, and how they cope with the unique challenges of the arctic environment.

1LT Jerry Cornell
Weapons Platoon Leader

CW3 (P) Robert Hawkins
Troop Standardization Officer

CW3 Terry Bennett
AH-1G Instructor Pilot

E Troop (AIR), 1st Cavalry
172d Light Infantry Brigade

AIR CAV in Alaska

ALASKA, the last American wilderness, the heart of the last frontier and home for Troop E (AIR), 1st Cavalry.

Alaskans like their independence. This same independent spirit is shared by our cavalry soldiers. With the troop's higher headquarters, the 172d Light Infantry Brigade, located 350 miles away at Ft. Richardson, the troop demonstrates daily an ability to work independently. Organized as a separate cavalry troop, Troop E shares an organization very similar to other cavalry troops, with the exception that the AH-1G Cobra, instead of the AH-1S, is the backbone of its aeroweapons platoon.

It takes a vast amount of training, common sense and experience to operate in the arctic. The extremes of the arctic environment do not stop the unit—they only alter its methods of execution. It is not uncommon to see the recon platoon

Infantry squad prepares to load UH-1H under blowing snow conditions

crossing the tundra on snow shoes or skis at minus 50 degrees Fahrenheit. Blowing snow, whiteout and ice fog are all common phenomena for the aircrews. Nowhere is flying any more hazardous and nowhere is a sense of mission accomplishment any greater. With little or no roads available, the lifeline for the ground force is its aircraft.

Air movement of troops and equipment and airmobile operations are key ingredients for success in Alaska. Troop E plays a major role in supporting these operations.

First to the scene, the troop is responsible for finding the enemy, aiding ground commanders with their planning and providing security for the force. In addition, the aeroweapons platoon provides the only aerial firepower organic to the 172d Light Infantry Brigade. Due to the limited amount of artillery in "Brigade Alaska," this highly mobile aerial firepower capability becomes an extremely valuable asset to ground commanders. Tactically, there is little difference in the troop's methods of operation, but a healthy respect for the environment leads to an adjustment in flying sense.

A magnetic deviation of 30 degrees, extreme temperatures, whiteouts, as little as 2 hours of daylight and snow conditions ranging from a few inches to several feet must all be considered when planning for tactical missions. Cold temperatures, windchill factors caused by turning rotor blades and static electricity almost eliminate the feasibility of hot refueling and rearming. Therefore, onstation time must be tightly managed to ensure constant coverage.

We minimize these problems by stressing thorough premission planning and the use of a series of lightgun signals from scout aircraft to reduce unnecessary aircraft movements and verbal communications. Flight routes must take advantage of the contours in the terrain, danger areas must be crossed quickly and the recon platoon must be called on more often to clear terrain. It is difficult to remain concealed in arctic conditions, but good aircrew training helps.

With the arrival in Alaska of Air Force A-10 close air support airplanes in January 1982, Troop E's mission has expanded to include this very important tactical element. Preparation and coordination for JAAT (Joint Air Attack Team) operations with the A-10s are now underway.

To further enhance the mission capability of the cavalry, night vision goggles training began last fall. Problems and limitations that arctic conditions will impose on the use of the night vision goggles are not completely known at this time.

Since its reactivation in Alaska in 1972, Troop E has met the challenge by providing reconnaissance and security for the 172d Light Infantry Brigade. Despite the harsh environment, Troop E (AIR), 1st United States Cavalry is the eyes and ears of the arctic soldier.

UH-1H from Fort Greely flight detachment landing on Gulkana Glacier

Glacier Operations

CW4 Robert L. McFarland
172d Aviation Detachment
Fort Greely, AK

GLACIER LANDINGS, winter or summer, are among the most difficult an Army aviator will ever make. Aircrews of the 172d Aviation Detachment, Ft. Greely, AK, routinely perform these operations on nearby Gulkana Glacier, and in the Alaska Range, in support of the post's Northern Warfare Training Center. The unit has conducted these operations for the past 18 years without accident or incident.

Members of the 172d are unanimous in their opinion that detailed preparation is the key to success in glacier operations as it is in all aviation operations. This includes not only the aircraft preparations but also the mental and physical conditioning of the aircrew. During glacier operations, capabilities of the human mind and eyes are somewhat limited in the detection of apparent rates of closure, angles of descent and degree of incline where marginal or negligible reference points are available at the landing site.

Optical problems, such as obtaining visual references, are increased even more by actual snowfall, blowing snow or by tremendous sun glare. A thorough understanding of TC 1-10, "Mountain Flying Sense," TC 1-12, "Cold Weather Flying Sense," as well as use of the Dash 10 Operator's Manual, is an absolute necessity

Glacier Operations

for proper premission planning and conducting the mission.

Once body, mind and aircraft are properly prepared and premission planning completed, the team is ready for a mission to the glacier. Landing elevations vary from 3,500 feet above mean sea level (MSL) to 12,500 feet MSL. Normally the landings are accomplished at altitudes of 4,500 to 8,500 feet MSL.

Once over the landing site, a high reconnaissance is conducted to determine the actual landing conditions, including snow obstacles, degree of slope and weather. Minimum weather requirements in the immediate area of landing should not be less than a ceiling of 1,000 feet above the landing zone elevation and visibility of at least 3 miles. Turbulence should not exceed that classified as light.

The approach begins after completion of the high reconnaissance and the approach axis is aligned as much as possible into the wind. Additionally, the flight is directed over the lowest obstacles to a relatively level area of sufficient size to allow the approach to be terminated on the landing surface (especially important when the possibility of blowing snow exists).

A low reconnaissance is conducted throughout the approach to spot any impending hazard that might preclude a safe landing; i.e., small obstructions, excessive inclines, uneven terrain or crevasses. The departure axis is also important to note during both the high and low reconnaissance as well as forced landing areas into and out of the area. If necessary, a go-around must be initiated at the earliest possible moment.

Because of the critical nature of the approach and landing and the inability of the human mind and eye to precisely judge all factors involved, the aircrew works as a team. They use every available asset to preclude spatial disorientation. This includes the use of any means possible to mark the touchdown point to aid in visual acuity and depth perception; use of aircraft flight instruments as a backup system for determining actual altitude, attitude and airspeed; and all crewmembers communicating what they see during the reconnaissance, approach and landing.

Upon landing the helicopter, the pilot maintains sufficient power in the aircraft until stability of the landing surface is determined. Then the pilot allows the aircraft to descend slowly, as he "feels" the surface for sloping, uneven, rough or icy surface conditions and depth of snow. Once firmly on the landing surface, the collective pitch is reduced full down. Personnel or equipment are not moved until the pilot advises that it is safe.

Takeoffs do not present much of a problem. However, before applying takeoff power, care must be taken during liftoff to ensure that the aircraft skids are free from the surface and not frozen in place, hung up in the rocks or buried in the snow. Altitude over airspeed takeoffs similar to maximum performance or instrument takeoffs are used to avoid prolonged hovering or low flight in blowing snow conditions. If taking off upslope, keep in mind that a snow-covered surface will appear to be level; therefore, maximum power available is used in this situation.

Turnouts from the landing area can be somewhat tight due to the limited maneuvering space in the glaciated valley and are made with additional reference to the flight instruments to avoid induced vertigo in an all-white environment.

The additional information listed below helps to

Infantry squad prepares to load an Akhlo, a sled-like device for carrying squad equipment on a UH-1H

combat the problems so far discussed:

• **Maintaining Spatial Orientation:** False sensations during periods of limited visibility are experienced by most aviators. Aviators become less susceptible to these false sensations and their effects as they acquire additional glacier and snowfield approach and landing experience. Although these sensations cannot be completely prevented, aviators can suppress them through maintenance of visual cues and cockpit communications.

• **Visual Cues:** Anything natural or man-made located in the immediate area of landing (even shadows which provide contrast) will help to provide the aircrew with a perspective of the landing area and aid in determining the rate of closure. If no cues are available, then the area must be marked by deploying flotation smoke markers, smoke grenades or suitable substitutes along the landing axis. Smoke should not only be used to mark the area but also to determine wind direction and velocity.

• **Searchlight:** Prior to takeoff for daylight glacier missions the searchlight is pre-positioned for use as a last-resort, depth perception aid. Prior to takeoff, position the searchlight so that it may be seen between the pilot's or copilot's pedals—depending on who is making the approach. Even on bright days, adequate illumination is provided by the aircraft searchlight to allow the crew to see the moving light on the snow. Both altitude and relative closure speed can be sensed through this technique.

• **Entry Airspeed:** For the approach, use 60/70 knots (for the UH-1 Huey) and the rate of descent should not exceed 300 feet per minute during the last 100 feet of the approach.

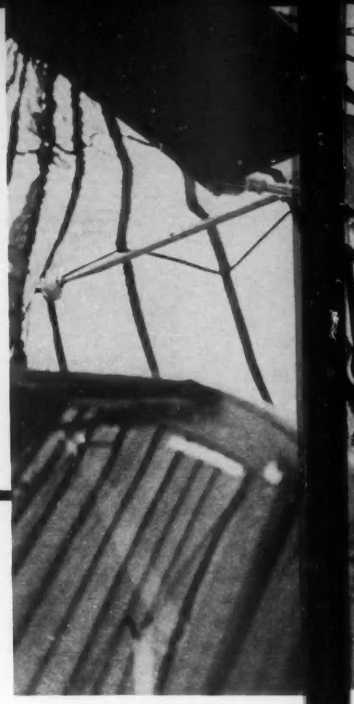
• **Approach Readouts:** During the approach it is an absolute must to determine rate of closure and to preclude fixation of the landing area. The pilot uses a proper scan technique while the copilot advises the pilot of indicated airspeed throughout the approach to help the pilot remain cognizant of his actual speed versus what he thinks his speed really is. Altitude verification should come from both the copilot's reference to the altimeter and the crewchief's call-out of 25-foot increments beginning at 100 feet above ground level (AGL) and 5-foot increments below 25 feet AGL. The crewchief must advise the pilot of the excessive rate of speed during the last portion of the approach. Additionally, blowing snow engulfs the aircraft from the rear. The crewchief must call out the location of the blowing snow as it works its way forward so that the pilot can anticipate the loss of all visual reference and terminate the approach accordingly.

Glacier and snowbasin operations put aircrews into a unique and unforgiving environment. Spatial disorientation is an always present danger, and proper mission preparation and training is critical for success.

ABOUT THE AUTHOR

CW4 McFarland is currently assigned as an instructor pilot with the 172d Aviation Detachment (Aug), Ft. Greely, AK. He is a dual-rated instrument flight examiner and instructor pilot and has 4,800 hours of helicopter time with considerable mountain flying time and snow landing experience as a result of assignments in Colorado, Korea, Germany and now Alaska.

WINTER AVIATION TECHNIQUES



THERE ARE SPECIAL skills that Army Aviation crewmembers must master before they can be expected to perform their duties efficiently in Alaska. During sling-loading operations for instance, pilots must foresee problems in landings and takeoffs with equipment attached. Slings must be considerably longer than normal so aircraft can hover above the cloud of snow caused by rotorwash. During rigging of a slingload, pilots cannot hover directly above the load while riggers hook it up. Aircraft must be landed to the side, idled to reduce wind chill, and then be hooked up.

Pilots also must be very careful when landing to pick up troops to avoid or minimize exposure to rotorwash and the increased chill factor.

In Alaska it is impossible to rely solely on any magnetic instrument due to the Earth's magnetic lines of force causing the magnet to point to the magnetic North Pole; magnetic deviation can be as much as 30 degrees. A solid snow cover causes terrain features to blend, making navigation very difficult. Under these conditions, pilots rely heavily on dead-reckoning rather than map-to-ground reference.

During winter, nap-of-the-earth flight often cannot be performed because the rotorwash of aircraft produces large snow clouds. The aircraft also leave signature trails over snow-covered trees during extreme cold, CH-47 Chinooks form contrails that can be seen for miles.

Flying in the arctic environment poses several unique and varied problems for the 283d Medical Detachment. All aspects of the aeromedical evacuation mission are affected by extreme weather conditions. At temperatures of minus 65 degrees Fahrenheit, intravenous fluids can freeze. Materials, such as plastic and rubber compositions which are often used in medical equipment, can crack or become brittle in use. Also, moving parts, such as the mechanical apparatus of patient oxygen systems, are likely to become inoperative.

Long-distance evacuations which require aircraft refueling present problems because the patient must be removed from the aircraft during the refueling process. Often patient shelter is limited, at best, against the harsh arctic climate. Special precautions must be taken to ensure that extremes in temperatures do not degrade the condition of the patient. As a result, members of the 283d go to great lengths to ensure that the patient is kept as warm as possible by using arctic sleeping bags and patient evacuation bags.

The problems presented by the cold temperatures are anticipated and overcome in several ways. Chemical heating pads are routinely used to increase the temperature of necessary fluids and moving parts in temperature sensitive equipment. Aircraft cabin heating is kept to a maximum to assure patient comfort, equipment stability and reliability.

The environment also imposes maintenance requirements not nor-

Specialist Four Mary Henderson
The author is currently
assigned to the
Public Affairs Office,
Fort Irwin, CA

Field maintenance being pulled on UH-1H using Herman Nelson heaters and a parachute for a shelter (U.S. Army photo)

mally experienced by aircraft outside Alaska. The temperature of aircraft moved to and from hangars in winter can fluctuate more than 100 degrees. An aircraft moved from a 50-degree hangar to an outside temperature of minus 50 degrees undergoes severe stress on its airframe, seals and paint.

The result is an increase in thermal stress cracks requiring extensive structual maintenance, leaking seals that have to be replaced, and a requirement for aircraft to be painted with polyurethane paint, which expands and contracts at about the same rate as the metal. Other types of paint crack and peel in the environment. The recent introduction of a polyurethane, low reflection, infrared paint will enable the aircraft fleet to be painted with low reflective paint, instead of the white and red paint used now.

Other effects of the Alaska cold on aircraft parts include quill seal leaks, damper leaks, servo leaks, hydraulic leaks at attaching points, failure of temperature sensing heater elements, breakdowns of mixing valves on heaters, linear actuator malfunctions, main rotor blade grip seal leaks, radio failure if not warmed up 20 minutes and battery failure at minus 25 degrees or lower.

While most aircraft maintenance is performed in hangar facilities during the winter, the brigade's aviation units have demonstrated their capability to perform extensive maintenance in the field at temperatures down to minus 40 degrees. This is accomplished in a heated maintenance area created by enclosing whole or parts of aircraft in cargo parachutes. Herman Nelson heaters are then used to heat the work area up to a temperature in which work can progress.

Aircraft configurations are somewhat different in Alaska to meet the demands of the environment. All aircraft have arctic muff heaters installed to meet cabin heating requirements. In addition, aircraft must operate with skis all year. In the winter, skis are required to operate in deep snow. In the summer, skis are necessary to land on the soft tundra and muskey covered terrain. An additional requirement for OH-58 Kiowa aircraft is high skid tubes which permit them to operate in the deep tundra.

Installation of skis on the UH-1 Huey has also required the installation of a vibration isolation skid support system to prevent fatigue damage to the skid cross tubes.

Extreme cold weather imposes unique fuel and lubrication requirements on aircraft systems. The oil (MIL-L-7808) used in the helicopter is different, because normal oil (MIL-L-23699) becomes too thick at temperatures below minus 25 degrees. Hydraulic systems use MIL-H-83282 for similar reasons.

Army Aviation in Alaska operates in a harsh environment. But an ongoing and thorough training program at all levels enables the many obstacles posed by the cold arctic to be overcome.

VIEWS FROM READERS

Editor: Enclosed is a short poem I composed.

CW3 C.L. Strange
Oklahoma ARNG

Aircrew Flight Training Period

Tuesday night special
is what we say.
We arrive at the ramp
for one day's pay.

We get our briefing,
mission, weather, and such.
CPT Murphy sometimes
is just too much.

Go get the logbook,
and don't forget the key.
Bring along the goggles
so we can see.

Looking for the numbers
as we go down the ramp.
Isn't this the one
we flew back from camp?

The number we got
"Ole seven seven nine"
You know where it was?
At the end of the line.

Preflight is done,
everything looks O.K.
The sun has set,
it's the end of the day.

Night is here
and dark as can be.

Hello Lunar Operations,
this is Lunar 23.

Authenticate what?
I don't understand.
My CEOI
is not on hand.

Open my flight plan,
we are hovering out.
This is gun lead,
will we have a scout?

Whiskey pad for departure,
and east bound if you please.
We have already eaten
so we don't need the "Cs."

Out to the river
and set up the lights.
Put on the goggles
and adjust the sights.

Too close to the trees
and moving too fast.
Much too dangerous
for this to last.

Too low on final
and close to a scream.
Paralyzed by fright
we awake from our dream.

Editor:

The article "When Will We Learn About Mountain Flying?" by Raymond P. Johnson, July 1982 *Aviation Digest* was very informative, instructive, and hopefully will aid in the prevention of high altitude operation mishaps. There is an omission, however, in this article and in TC 1-10 that could be critical to preserving life, preventing injuries, and minimizing damage to rotary winged aircraft. This omission concerns performance planning.

Utilizing the performance data in the -10 for a UH-1H it is apparent that cruise flight at 12,000 feet pressure altitude, temperature of +20 degrees Centigrade, gross weight of 8,500 pounds, with a true airspeed of 80 knots is totally within the performance capability of the aircraft. Cruise flight under these circumstances would require 29 PSI of calibrated torque while 34.5 PSI is available. Wherein does the problem lie? It lies with that unscheduled landing that will someday invariably occur!

What actions would a pilot initiate if confronted with an emergency that requires a landing "as soon as possible"? Using the above data, attempting to land at 12,000 feet pressure in an open field is very likely the wrong (and possibly catastrophic) solution when one considers that 39.7 pounds of calibrated torque is required to execute this approach to a mere 2-foot hover. This is 5.2 pounds of calibrated torque more than what is available!

A very plausible solution would be to descend to an altitude that would allow a landing without an associated

deterioration of engine rpm. Again using the above data and incorporating the standard temperature lapse rate, it becomes clear that a descent to 8,000 feet pressure altitude is necessary before a safe landing to a 2-foot hover can be successfully completed.

The lesson is clear. In addition to computing the normal cruise data on the PPC, the alert mountain pilot will also compute what his safe landing altitude will be for each segment of his flight *before* an emergency exists. When an emergency situation develops in rugged mountainous terrain the decisions that must be made by the pilot are difficult, usually more so than those that would be made at low elevations. There is one fact that must be remembered, however, many emergency procedures require the pilot to "land as soon as possible" not "crash as soon as possible."

CW3 D. A. Geiger
Installation Flight Standards
Ft. Carson, CO

• Editorial Note: CW3 Geiger's comments refer to operations of a "fly through" nature, rather than a "fly in an area" operation.

Editor:

Hopefully, the majority of the Army Aviation community does read the USAREUR Aviation Officer's letter in this section in the July 1982 issue. He hit the nail right on the head. It is time for Army Aviation to become "a branch equal to the other combat arms." Until Army Aviation achieves formal branch status (to include its own distinctive insignia), it is never going to make the maximum contribution of which it is capable.

Army aviators will continue to be an amorphous mass as a group. Individually, they will be somewhat negatively identified as belonging to a "carrier" branch. An identification which has something of the orphan stepchild ring to it.

On the organizational level, Army Aviation is a continuously evolving member of the combined arms team. One which grows more potent in terms of combat power as it evolves. It is, most definitely, not a replacement for the horse, truck or tank.

Proponency for all facets of Army Aviation—attack, airmobility and medium/heavy lift—belongs at its home, Ft. Rucker (just as the oversight for the other members of the combined arms team, and indeed all other branches, occurs at their "home" installations). Additionally, the leaders of Army Aviation should receive their officer basic and advanced course instruction at Ft. Rucker. To a large extent, the physical facilities and the instructor expertise are already on hand to accomplish such an endeavor.

Along with branch status and schooling, Army Aviation should have, as is depicted, its own branch insignia for practical reasons as well as esprit de corps. I offer two possible designs for consideration as a branch insignia. The

first design, incorporating a rotor and a propeller, reflects the lineage of modern Army Aviation. The propeller represents the origin of modern Army Aviation—the Liaison Pilots of World War II. The rotor symbolizes the foundation of Army Aviation of today and the future—rotary-wing aircraft. It, also, symbolizes the employment of the newest member of the combined arms team in Korea and Vietnam and in the Army of the 1980s and beyond. The second design is provided for consideration without any elaboration.

Army Aviation's time has come. Time for its own branch, to include proponency, schooling, and insignia.

MAJ Robert P. Fallis
Command and General Staff College
Ft. Leavenworth, KS

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Pam Mc Lemore photo by Tom Greene

SPH-4 Helmet Chinstrap Modification

The following has been extracted from an article published in FLIGHTFAX, Vol. 10, No. 6, 4 Nov 81, based on a "fix" recommended by the U.S. Army Aeromedical Research Laboratory (USAARL), Ft. Rucker, AL, for the chinstrap on the SPH-4 flyer's helmet.

Several cases have been reported in which the SPH-4 helmet chinstrap was pulled through the cloth retention assembly, not only during mishaps, but also through normal use. Action has been taken to change the present design, but it will be some time before all helmets are retrofitted. Therefore, until new chinstraps are available, it is recommended that a washer be added to the inside of the cloth retention harness to prevent the metal grommet from pulling through the cloth. The washer may be steel, brass or aluminum. Plating is not required since this is an interim solution. Insert the post/screw assembly through the harness and washer, and secure the threads with a locktight type of adhesive to prevent loosening of the screw. The washer should be AN970-3 or equivalent and conform to the following specifications:

Diameter	0.75 to 1.00
Thickness	0.030 to 0.070
Diameter of Center Hole	0.203 to 0.265

For more information, contact Mr. Joe Haley, USAARL, AUTOVON 558-6890/6895.

Due to the related safety problem it is imperative that this data be disseminated immediately to all echelons of supply and the user level and should be performed on all chinstraps regardless of who is the manufacturer.

Points of contact for this activity are Ms. Geri Lyles or Mr. Joe Popazravanov, STSAP-SCO, AUTOVON 444-1537.

Helmet—SPH-4 Flyer's Helmet

The following data replaces information in the Army Support Activity Supply Information Letter, Number 1-82, Part III, Item 14C, page 22 and PEARL articles.

To diminish difficulties incurred when the helmet foam liner is replaced, Natick Laboratories recommended the use of a silicone rubber base adhesive (sealant). The adhesives listed below are available through the GSA catalog and are currently in the AMDF:

- NSN 8040-00-833-9563: Silicone Rubber Base Adhesive-White, Dow Corning, R.T.V., 732, 5 oz tube, unit price $1.15.
- NSN 8040-00-225-4548: Silicone Rubber Base Adhesive-White, General Electric, R.T.V., 102, 12 oz cartridge, unit price $1.50.

Application Procedure: Apply by spatula random located deposits of Silicone Adhesive to the outside surface of the styrene, foam liner. Position these deposits so as to obtain optimum adhesive contacts, covering about 50 percent of the surface area. Set the liner into the helmet and press into proper position. Clamps in position for 4 to 8 hours. The residual odor of acetic acid (vinegar) may be removed by exposing the prepared helmet to a well ventilated area.

- Adhesive can also be applied by finger or alternative methods.
- Liner can be removed by the use of such hand tools as a narrow wood chisel or putty knife.
- Residual silicone adhesive also can be removed from the helmet by the above tools.

Request for additional information may be addressed to Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MCAPL, 4300 Goodfellow Boulevard, St. Louis, MO 63120. Point of contact is Mr. Boone Hopkins, AUTOVON 693-3112, or commercial (314) 263-3112.

Handling and Shipping Of Emergency Parachutes and Related Equipment

Reference is made to TSARCOM message 122130Z Oct 82, subject: Definitive Handling and Shipping Instructions for Emergency Parachutes and Related Equipment. This message was transmitted to advise parachute rigger and aviation maintenance personnel of the specific requirements of handling and shipping emergency parachutes and related equipment. The message has been retransmitted to all aviation units, and a copy should be secured and complied with. Adequate criteria for the storage of parachutes and related equipment is contained in Chapter 5 of TM 10-1670-201-23. The information contained in referenced message will be published in the next scheduled change to the appropriate aircraft and parachute maintenance manuals. Point of contact is Mr. D.B. Hopkins, DRSTS-MCAPL, AUTOVON 693-3112 or commercial (314) 263-3112.

Survival Kit Inspection Intervals

Have you received your copy of Interim Change No. 101, dated 22 October 1982 to AR 40-61? If you have, we direct your attention to paragraph 1a, line 4, in parenthesis "(every 90 days)"; —this time interval should be changed to *120* days. This change is made to standardize inspection intervals for *all* Army survival kits. This action has been coordinated with the Department of the Army Surgeon General's Office and will be posted in Change 1 to AR 40-61 when published.

Jacket, Cold Weather

Army flight personnel are advised of a possible hazardous situation created by issue of jackets, cold weather, NSN 8415-01-074-9413 through 9427, that have inadequate antistatic treatment. These jackets were issued as a replacement for jacket, man's, medium weight, NSN 8415-00-217-7387 series.

Defective jackets, issued from September 1981 through February 1982, can be identified by checking the bottom closure for the following markings on cartons shipped:

Lancer Clothing Corp., Contract #DLA100-80-C-2439; Partial Shipment #8 through #23; Containers #834 through #5373 inclusive.

Issues made to flyers from the above containers should be recalled. Flyers are not to wear these jackets near volatile fluids or munitions. An attempt should be made to locate the defective jackets. Disposition instructions for these items can be obtained by submitting a message to Commander, Defense Personnel Support Center. ATTN: DPSCTSEB, 2800 South 20th Street, Philadelphia, PA 19101. Point of contact is Mr. Henry McCann, AUTOVON/444-2584.

Aircrew Personnel Equipment Shortages

The following items of aviation life support equipment (ALSE) are in short supply and materiel obligation release dates are identified:

NOMENCLATURE	SIZE	NSN	MATERIEL OBLIGATION RELEASE DATE
Coveralls, Flyer's CWU 27/P	32R	8415-01-043-8377	September 1982
	34R	-8379	"
	36R	-8381	"
	38R	-8384	"
	38L	-8385	"
	40S	-8386	"
	40R	-8387	"
	40L	-8388	"
	42L	-8390	"
	44R	-8392	"
	44L	-8393	"
	46L	-8396	"
	42R	-9529	"
Gloves, Flyer's, Fire Retardant, FRP-2	9	8415-01-029-0112	October 1982
	10	-0113	"
	11	-0116	"
Goggles, Sun, Wind and Dust		8465-01-004-2893	September 1982
Pad, Earcup, Chafing for SPH-4 Helmet		8415-01-017-5708	September 1982
Screw Assembly, Hsg and track for SPH-4 Helmet		8415-00-490-1202	November 1982
Screw Assembly, Susp and Retention, SPH-4 Helmet		8415-00-490-1201	November 1982
Suit, CP (Overgarment)	XXS	8415-01-490-1879	Pending Procurement of New BDO
	XXXS	-1880	
Visor, Lens Assembly (Neutral) for SPH-4 Helmet		8415-00-490-1196	October 1982
Visor, Lens Assembly (Neutral-Poly Carb) for SPH-4 Helmet		8415-00-490-1197	October 1982

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

REPORTING FINAL

Late News From Army Aviation Activities

FROM FORT BENNING

498th Receives Award. The 498th Medical Company (Air Ambulance) has received United of Omaha's annual Public Service Award.

Retired Air Force Lieutenant General James H. "Jimmy" Doolittle, chairman of the insurance company's award committee, made the presentation in recognition of the unit's outstanding contributions to public health, safety and security. It was accepted by Major Dennis C. Story, 498th commander.

Specifically, the air ambulance company was honored for its work since 1974 in transporting 1,081 imperiled infants to the high-risk nursery at the Columbus (GA) Medical Center as a part of the MAST (Military Assistance to Safety and Traffic) program. **(USAIC PAO)**

FROM PENNSYLVANIA

Help for Aviation Units. Tobyhanna Army Depot's hotline number is AUTOVON 795-7900 and commercial 717-894-7900.

The depot's primary areas of responsibility are aircraft survivability equipment, airborne navigation equipment, ground control approach systems and OV-1D sensor systems.

Technical assistance is offered to aviation maintenance units on the following systems:

AN/ASN-86	Inertial Navigation Set
AN/AAS-24	Infrared Detecting Set
AN/ALQ-144	Countermeasures Set
AN/ALQ-147	Countermeasures Set
AN/APS-94	Radar Surveillance Set
AN/ARN-89	Direction Finder Set
AN/ASN-33	Navigation Computer Set
AN/ASW-12	Automatic Flight Control System
AN/AYA-10	Data Annotation System
AN/TKQ-2	Radar Data Receiving System
AN/TSC-61B	Flight Coordination Center
AN/TSW-7	Air Traffic Control Central
AN/TSQ-71	Landing Control Center
AN/FPN-40	Landing Control Systems
KA-76/KA-60	Aerial Cameras

(SDSTO-FM)

LTG James H. Doolittle (USAF, Ret.), center, presents the United of Omaha Public Service Award to MAJ Dennis C. Story, commander, 498th Medical Company (Air Ambulance), Ft. Benning, GA. MG Robert L. Wetzel, left, Ft. Benning's commanding general, also participated in the ceremony which honored the unit for its participation in the MAST (Military Assistance to Safety and Traffic) program

FROM FORT RUCKER

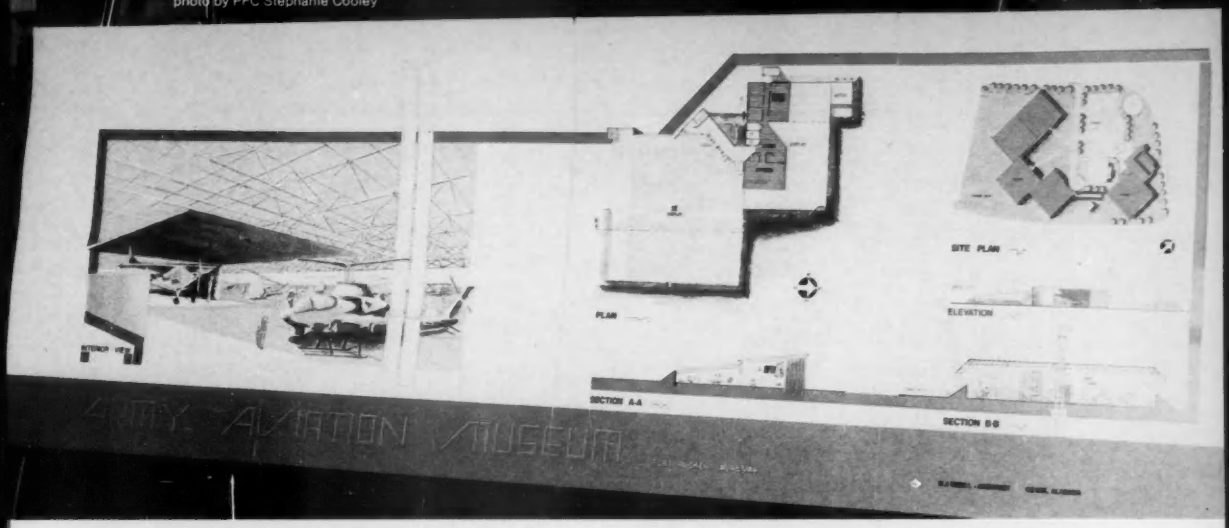
Aviation Update Conference. About 60 aviation instructors from all TRADOC schools and representatives from FORSCOM, the NGB and RCPAC attended this two-day conference in December. They received updated information on a wide range of aviation topics, including force structure, doctrine, equipment, training and personnel management.

In his welcome address, BG Charles E. Teeter, deputy commanding general of the Army Aviation Center, said the meeting was held to fulfill the Combined Arms Center requirement of all proponency installations for such an update. He said it is anticipated the conferences will be held each year to facilitate the integration of all activities into the combined arms team.

According to CPT Wayne D. Davis, project officer for the sponsoring agency, the Directorate of Training Developments, critiques showed the conference to have been productive for the attendees.

Safety Questions. The increased aviation accident rate in fiscal year 1982 means aviation

photo by PFC Stephanie Cooley



Here it is!....This design for phase I of the Army Aviation Museum, Ft. Rucker, AL, has been approved by the Museum Foundation's building committee and the Army Aviation Center's select committee. It consists of two structures—a 32,000 square foot air conditioned building and a 40,000 square foot space dome. The former will have an upstairs area for use as a multipurpose room and administrative offices. Downstairs will be 20,000 square feet for the display of fabric covered aircraft, uniforms, gun systems and other items that cannot be left outside. The Army Aviation Hall of Fame also will be in this building. The space dome will be 42 feet high and will present an unobstructed viewing area for the displays except for four support poles in the center. According to the architect, the building's design will avoid the winter winds and will take advantage of the summer breezes. It has a 10-foot berm around it which will enhance the use of nature to keep the building comfortable year-round

people must concentrate more on safety. One way to help the community to be ACCIDENT FREE IN '83 is to place aviation safety awareness questions in the Annual Written Examination. Plans are for such questions to be added to the exam that begins 1 April 1983 and to be included in the 1984 exam.

These questions will deal with recurring deficiencies in the field of aviation safety or with recent changes in accident prevention. Test control officers will receive complete instructions on the questions' implementation.

D Model Chinook at Rucker. The first CH-47D model Chinook helicopter is now in the inventory at the Army Aviation Center.

Major General Carl H. McNair Jr. received the logbook and keys to the remodeled troop/cargo-carrying aircraft from Colonel Dewitt T. Irby Jr., the CH-47 modernization program project manager, Tuesday, 7 December.

The aircraft was a 1967 A model that accumulated 2,000 flight hours in the Vietnam War and 4,000 total flight hours.

SFC Marvin W. Flatt, left a CH-47 Chinook crewchief at Ft. Rucker, AL, receives the Broken Wing Award from MG Carl H. McNair Jr., Ft. Rucker's commanding general. SFC Flatt is the first Army enlisted person to be presented the award which recognizes the safe recovery of an aircraft from an inflight emergency. When the Chinook experienced a loss of rotor rpm, the crewchief was able to release its 10,800-pound external load, thus stopping the aircraft's too rapid descent and allowing a safe landing

photo by SP5 NoelKenya Atkins

FROM WASHINGTON

New Four-Star Appointee. Lieutenant General William R. Richardson has been nominated by President Reagan for appointment to the rank of general, pending Senate confirmation.

On 11 March he will become commander of the Army's Training and Doctrine Command, Ft. Monroe, VA. General Glenn K. Otis, current TRADOC commander, moves to the position as commander in chief, U.S. Army, Europe.

Oldest Reservist Sought. The Army Reserve is looking for its oldest living alumnus to participate in the USAR's 75th anniversary celebration 23 April 1983. Contact Lew Brodsky, director of public affairs for the chief, USAR, at (202) 697-8619. Or write to him at the chief's office ATTN: DAAR-PA, Washington, DC 20310. **(ARNEWS)**

AVIATION PERSONNEL NOTES

Senior Service College Selectees

Congratulations! Headquarters, MILPERCEN, has announced the names of officers selected for attendance at a senior service college (SSC) during academic year 1983/84. The following aviators were selected:

LTC Ronald E. Adams
LTC (P) Henry U.B. Brummett
LTC Dante A. Camie
LTC Willard T. Carter
LTC Richard G. Chapman Jr.
LTC John F. Connelly
LTC Charles A. Cornell
LTC Moses Erkins
LTC Philip W. Gaskins
LTC Turner E. Grimsley
LTC Robert D. Hurley
COL Dewitt T. Irby Jr.
LTC James E. Kollar
LTC (P) Gerald Lord
LTC Marvin E. Mitchiner Jr.
LTC James G. Moreau
LTC Haspard R. Murphy
LTC (P) Barry J. Sottak
LTC Jerry T. Wagner
LTC John T. Wells
COL Paul J. Wenzel

Civil Education

Do you need a master's degree for promotion? *NO*! A graduate degree does not play a significant role in promotion selection. In fact, a graduate degree is of no value unless converted to performance. Graduate schooling is the means to prepare officers to perform well in those jobs for which normal military training and job experience do not prepare them. Superior performance remains the hallmark to advancement.

Officer Efficiency Report (OER) Appeals

Individuals desiring to appeal an OER often need a copy of their published rating chain. Although AR 623-105 directs that rating chains will be published, it does not direct that these documents will be maintained after an officer departs that duty position. Officers should retain a copy of their published rating chain for future reference with respect to future appeals.

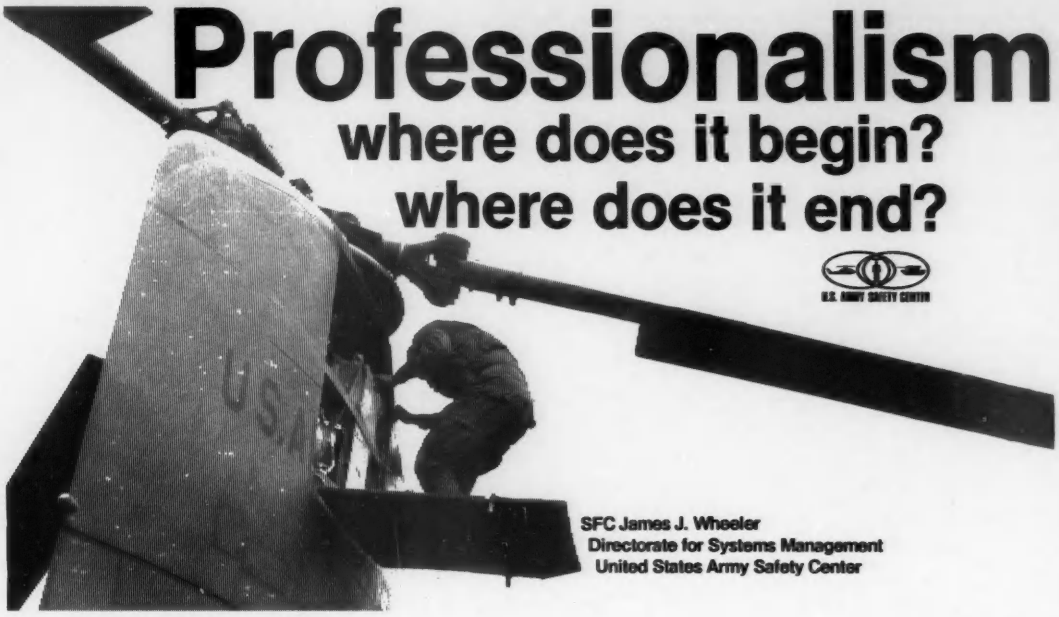
Attention Aircraft Maintenance Office and Repair Technician Course Phase II Grads:

Check your Officer Record Brief. If the appropriate Phase II qualification is not annotated in Section VI, Military Education, see your servicing military personnel office to make the SIDPERS entry. Nobody wants to miss a good assignment because their record is not up to date!

AR 600-105, "Aviation Service Of Rated Officers"

Watch for changes. Military Personnel Center is hosting a conference this month to review 2028s and comments from the field. Approved changes should hit the street in February or March.

Professionalism
where does it begin? where does it end?



SFC James J. Wheeler
Directorate for Systems Management
United States Army Safety Center

TO SOME SOLDIERS, this is an easy question to answer. Each soldier has his own perception of what professionalism really means. Some think it's being an all-around good soldier—physically and mentally fit. Some think just showing up at work on time is enough. Some think it's not expressing feelings or opinions and not "making waves" in the system, whatever the system is. Some think it's giving deserving soldiers time off for a job "well done"—like passing an annual IG inspection. Some think it's identifying "duds" and running them out of the Army instead of training them to be good soldiers. Some think it's working at least 16 hours a day, and some think it's getting the job done in 8 hours. Some think training in areas not MOS-related is important. Why are first aid, NBC procedures, POL handling, explosives awareness, proper care of TA-50 gear, motor pool stables, Geneva Convention agreements, hygiene in field environments, and M-16 maintenance important to a CH-47 mechanic? YUK! You can't fix aircraft if your training is geared for an infantryman! Of course, if we go to war and you become a casualty because you didn't know how to take care of yourself and your equipment, you couldn't fix aircraft either.

Some think professionalism is getting a pat on the back every day and getting promoted ahead of their contemporaries. Some even go out of their way to score points with their bosses to accomplish this, whether it's right or wrong. Some think it's sending inexperienced aircraft mechanics on post or first sergeant detail and using a few experienced soldiers or a TI. After all, his records show that he's been in Chinook units his entire career. Maybe, now that he's an E5 because of his to perform all the maintenance. They reason that "after all, this kid is school-trained; it's not our responsibility to let him gain knowledge and experience by letting him actually perform maintenance on our aircraft." Maybe they should think "the kid should learn from his mistakes and have a good mechanic guide him through difficult tasks." Still others see it differently. "We need those aircraft today. Let someone else train him. I just don't have the time."

Unfortunately, the inexperienced mechanic knows all about "police call," but nothing about properly rigging a fuel control after an N2 actuator change so the engine will perform properly when called upon. I wonder what this same soldier will be doing 4 years from now—if he's still in the Army after doing "post police detail" for 2 years! Maybe we'll make him a phased maintenance team leader time in service, we'll make him a "flight engineer" on a CH-47.

Where Does It Begin? Where Does It End?

After all, he should know how to identify problems encountered in flight and tell the pilots what's really going on back on the ramp!

"Chief, I smell fluid! Do we have a leak or something back there?" cries a justifiably concerned pilot.

"Well, sir, there is a lot of fluid coming from somewhere. It's just spraying everywhere! It's been that way since we took off!"

"What is it, Chief? Where's it coming from? Is it transmission oil, flight boost fluid, the utility system? Come on, Chief, answer me!"

"Well, er, let's see, sir. Is hydraulic fluid red or brown?"

Are there situations like this in your unit? What are you doing to correct them? Is trying to correct situations like this part of professionalism?

Some think professionalism is "mission accomplishment" no matter what the cost! Have you ever heard:

"I don't care if 022 does have a weak engine. I need her right now to sling load a bridge section for A Company."

"But sir, if you can get that same mission tomorrow, I can give you 863, which is our strongest bird. We can take that bridge to H____and back on one engine if we want to!"

"Soldier, I want 022's blades turning in 25 minutes. Do you understand?"

Unfortunately, 022 never came back. She picked up the bridge OK, but the LZ she was taking it to was 5,000 feet above the point of origin. She crashed halfway there, killing all aboard. Too bad; we could probably have used her next week for mail runs until good engines came in for her. Now we have to use one of our strong birds for that commitment. Hopefully, the replacement crew, when we get them, will have as much experience as 022's had. Good thing we're not at war; that crash would have really hurt our company's effectiveness within the battalion.

Do we really understand professionalism? Do we really know how important our jobs, professions, MOS are to the Army and its mission? Is there really a "big picture" out there where all our individual efforts, no matter how small they may seem, play an important role in the overall mission/objective? Is your unit's readiness really important to the battalion's, the corps' and the division's mission if the balloon goes up? If your unit were called upon to go to the "real" field (Israel, Cuba, Saudi Arabia, Egypt, Lebanon, Africa, Germany, etc.), are you ready to go? If not, what are you as a professional soldier doing about it? Is part of professionalism worrying about the training, readiness and equipment condition of your unit, platoon, team and individual? Just how important is a small thing like by-the-book maintenance? Can this impact on a mission? Consider the following case.

A CH-47 was on the maintenance ramp for an unscheduled engine and engine transmission change. The maintenance team assigned to do the task had experienced and inexperienced soldiers. A technical manual was never opened. Some of these soldiers had changed engines and engine transmissions a hundred times before. The change-out was made without incident; the aircraft was MOC'd, test flown and released for flight. The next day the aircraft was scheduled to sling load an expensive radar disc to the top of a mountain. the pickup was uneventful; however, upon approach to the LZ, a loud bang was heard and the No. 1 engine went into overspeed and exploded. Rotor rpm decreased rapidly. The pilot jettisoned the sling load to reduce the gross weight. The radar disc fell 1,000 feet down the side of the mountain and was destroyed. Rotor rpm was recovered and an emergency landing was made to the LZ. There was a fire on the No. 1 engine side that rapidly increased in intensity. The aft pylon was also engulfed in flames.

The crew executed emergency shutdown procedures and evacuated the aircraft. The hand-held fire extinguisher on board the aircraft just wasn't enough to contain the fire. The aircraft was destroyed.

What caused this accident? A bolt located on the engine's inlet cover which must be removed from a certain position,

depending on whether the engine will be installed on the No. 1 or the No. 2 side, was not removed from this engine as explicitly spelled out in the TM. This caused the engine transmission to be slightly misaligned with the engine's output shaft when it was installed. During operation, the misalignment resulted in failure of the engine output shaft which, when disconnected from the drive train system, immediately oversped to the point of exploding. An MWO has since been applied to the engine inlet covers, at great cost to the government, to replace these bolts with beveled, flush-type screws.

But what did this slight error really cost us? A replacement aircraft will cost millions of dollars and probably can't be procured until FY 88 or 89 as current budget cycle restraints prohibit earlier procurement. What about the radar disc? Was it to be used in conjunction with our national security effort? Was it to be placed on that particular mountain top because it was a vulnerable area for attack? I don't know the answer to that, but let's say it was. Again, because of current procurement policies and procedures, a replacement disc cannot be bought and placed on that mountain top until FY 88 or 89! Does this affect our readiness and national security? Professionalism? Why wasn't by-the-book maintenance performed? Whose responsibility was it really? Commanders? Platoon leaders? Platoon sergeants? Team leaders? Shop supervisors? TIs? Individual soldiers? All of the above?

The U.S. Army Safety Center data bank is full of stories like the one above. There has been an outcry from Army maintenance sergeants about the quality of the new young soldiers arriving in their units. I wonder if that same outcry was voiced by their sergeants when they arrived at their first unit as privates. I wonder if their sergeants just complained or if they took the time to train and guide them. Somebody must have looked out for these old-time maintenance sergeants! Otherwise, how have they acquired all the knowledge and experience they guard as a precious asset and refuse to pass on to these young soldiers? Professionalism? What impact will this have on the Army's overall readiness posture 5 to 10 years from now? How secure will all the retired commanders, platoon leaders, platoon sergeants, and team leaders feel when they are fishing on the riverbank knowing that the privates, sergeants, aviators, etc., they trained so well are now the soldiers they rely on to protect them and their families from enemy aggression?

What magic ingredients really make a professional soldier? The ability to pass on responsibility instead of accepting it? The ability to clean an M-16 in 10 minutes? The ability to drink a case of beer and still walk? Possess all the knowledge and skills required to perform his job? Constantly strive to gain knowledge and stay abreast of the Army's changing tactics and doctrine? Learn all he can about new equipment and ideas? Who really knows? Will half our assets and resources be lost on the way to the battlefield because of lack of professionalism, or will we perform our mission and come back so we can do it again tomorrow?

"Major, I need six of your Chinooks tomorrow morning to move A Company to Baker Forward."

"I'm sorry, sir; we lost four Chinooks today. I can only give you three."

"What do you mean you lost four Chinooks today? What happened? Did they get shot down?"

"Well, er, no, sir. One was hovering in a confined area and drifted into the trees. The rotor blades hit several trees, breaking two blades off. Two aircraft taxied into each other at POL. One aircraft is down for an engine change—one of my mechanics didn't properly install a lubrication line and all the oil was lost in flight, ruining the engine."

"Gee, Major! If we don't get A Company to Baker Forward by tomorrow noon, we could lose that whole sector to the enemy!"

What is professionalism? Webster defines it as "the conduct, aims, or qualities that characterize or mark a profession or a professional person." It is time for each of us as career soldiers to take a good look at our conduct, aims and qualities that mark us as professionals. Just how does our conduct affect our jobs? Do our superiors and subordinates look at our conduct and judge us accordingly? Just what are our aims? Are they too high? Too low? Do we have any? Are we fully qualified for the jobs we're assigned? If not, are we earnestly trying to become qualified, or are we just tap dancing through?

So, where does professionalism begin and where does it really end? What do you think?

AR 95-1, Effective January 1983

In June 1981, a decision was made by Department of the Army to revise and reformat AR 95-1 in an attempt to eliminate duplication, delete "how-to" information, clarify issues and update the document.

The new revised AR 95-1, effective 1 Jan 83, is in distribution at this time.

Some of the significant changes appearing in the revision are:

- *Flight condition symbols* for the "night hood" and "night vision devices" have been added in paragraph 1-19.
- *All "how-to" information* for completing DA Forms 759 and 759-1 has been removed and will appear in FM 1-300. Until the revised FM 1-300 is distributed, personnel/organizations charged with the responsibility for maintaining flight records should retain and refer to Chapter 7, AR 95-1, dated 15 November 1980 for administrative guidance.
- *The new Table 1-1* provides for distribution of DA Forms 759 and 759-1. Note that a copy is no longer forwarded to the next higher headquarters for review. One copy, in the case of an IP, SIP or IFE must be forwarded to DES, USAAVNC.
- *A new section* has been added to chapter 2 to better define the authorized uses of Army aircraft and outline the operational support airlift program.
- *Table 2-3 provides* a crew rest scheduling guide for commanders to use in developing mandatory crew rest programs. It is important to remember that this is a "guide" and not a DA mandated schedule.
- *Paragraph 2-19a* directs that all passengers in Army aircraft must occupy a seat and be restrained by a seat belt during takeoffs, landings and turbulence. Seat requirements may be waived only for parachute drops, rappelling, and life or death missions. Seat belt requirements cannot be waived.
- *Actions taken by commanders* when an aviator fails a hands-on performance test are given in paragraph 3-31c. There is a distinct difference in required actions for primary and alternate/additional aircraft. Note that restrictions imposed on the aviator after failure must be listed on DA Form 4507-R.
- *Destination weather* must be forecast to be VFR at ETA plus one hour for VFR flights. This means that forecast Special VFR at the destination cannot be used for VFR flight, except for airports in the local area where aviators can be assured of a Special VFR clearance to enter the control zone.
- *The term "clearance authority"* has been deleted from AR 95-1 because there was confusion as to how "clearance authority" and "approving authority" were related. Paragraph 4-2d now states that the pilot in command has approval authority for aircraft under his/her control.
- *Alternate airfield requirements* have been changed almost as many times as this regulation has. "Standard" alternate minimums were adopted years ago in an effort to simplify alternate selection. Since there was confusion in regard to "standard" criteria, the regulation (paragraphs 4-2f and g) now directs the aviator, in all situations, to add 400 feet and 1 mile to the weather planning minimums for the approach to be flown. VFR airports may be used as alternates, but an airport with an unmonitored approach facility is not acceptable unless it meets VFR requirements.
- *Missed approach* is addressed in paragraph 4-5c. If a missed approach is flown and an ATC clearance is requested to a new destination, a revised flight plan must be filed. If fuel on board is sufficient, a new alternate may be selected.
- *The importance of maintenance test* flight standardization is highlighted by paragraph 2-21: "Maintenance test flights *will* be conducted per TM 55-1500-328-25" and maintenance test pilots will be qualified and current per FM 55-44.
- *Annual physical examinations* for aviators are governed by AR 40-501 and are no longer listed as a

part of AAPART. This change eliminates conflicting physical examination requirements from AR 95-1.

- *Commanders will investigate* circumstances surrounding an aviator's failure to meet ATP requirements and may authorize additional time for completion of minimums.
- *Airplane touch-and-go landings* may be performed under the conditions specified in paragraph 3-12. The unit commander may approve training involving touch-and-go landings.
- *Definitions of pilot in command* (PIC), pilot (P), copilot (CP), instrument flight examiner (IFE) and maintenance test pilot (MTP) are shown in paragraphs 3-21, 3-22, 3-23, 3-26 and 3-28. Changes to these paragraphs impact on qualification of many Army aviators. For example, attendance of a USAAVNC course is no longer required to become an IFE.
- *Paragraph 3-30b* addresses instrument flight evaluations. An IFE, IP or SIP qualified and current in the aircraft being flown must be at one set of flight controls when performing unusual altitudes, simulated engine shutdown or engine failures, and autorotations.
- *If tactical helicopter training* is to be conducted in reduced weather conditions, the aircraft must be equipped for IMC flight and have appropriate avionics (Table 4-1). This means that even though OH-58, OH-6 and AH-1 helicopters are not qualified per the operator's manual for IMC flight (because of undesirable handling qualities), they must meet the IMC equipment requirements of Table 4-2 if flown under reduced weather conditions.

This regulation has 22 fewer pages than the one it replaces. Some of the reduction in pages came about because the flight records chapter was removed, but a more significant reduction was realized by referring to other appropriate publications—rather than duplicating the information contained therein. This should prevent possible contradictions between the various publications used in Army Aviation.

If aviators have difficulty in understanding the information contained in this regulation, they should obtain guidance from their local aviation standardization committees. Finally, this version of "Army Aviation: General Provisions and Flight Regulations" is intended to allow commanders the proper degree of flexibility in the management of personnel and resources to enhance command, control and operation of Army aircraft for which they are responsible.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hot Line, AUTOVON 558-6487 or 205-255-6487 and leave a message

CONNECTION

ACTAAT

Aviation Center Training Analysis and Assistance Team

ISSUE: Due to the remote siting of medical evacuation aircraft from the maintenance facilities and the frequent occurrence of urgent missions, the pilot in command should have the authority to "sign off" the installation or removal of high performance rescue hoist (HPRH) in the UH-1.

COMMENT: Installation or removal of a rescue hoist requires an entry on DD Form 365C, Basic Weight and Balance Record of the aircraft. AR 95-1 instructs the commander to appoint weight and balance technicians (officer or enlisted) in writing to perform duties on a full-time or part-time basis. The commander may specify pilots in command to "sign off" installation or removal of rescue hoists. The correct "sign off" procedure would be to make appropriate entries on the DD Form 365C and new DA Form 365F, Weight and Balance Clearance Form, as specified in AR 95-16. (Directorate of Evaluation and Standardization)

SAFETY IN NUMBERS

THE MISSION OF the 24th Medical Air Ambulance Company (AAC), Nebraska Army National Guard (ARNG) is to sustain and save lives. Mission success correlates to unit readiness. Neither can be accomplished without a positive approach to aviation safety. Where a commander places emphasis and assigns priorities, determines what the outcome will be. Major Rocky Molina, the 24th Medical Company commander (July 1978 to October 1981), kept a tight rein on this air ambulance company in Lincoln, NE.

Accepting the challenge to participate in "Wounded Warrior 1," the largest combat medical exercise in the United States since World War II, offered Major Molina the opportunity to evaluate the effectiveness of training and mobilization planning. It's not easy to move a unit from Lincoln to Camp Roberts, CA, participate in a major FTX (field training exercise), and return to home station in a 15-day annual training period. This certainly isn't accomplished by waving a magic wand. With a positive attitude, this unit did make it happen. Not only did they participate in this exercise, but they also validated the Army Training and Evaluation Program (ARTEP) for air ambulance units at the request of Forces Command.

Seventeen UH-1 Huey aircraft, TOE equipment (table of organization and equipment), and 170 personnel left the plains of Nebraska for the sunshine of California via organic aircraft, Air National Guard C-130s and commercial carriers to accomplish a mission thought to be too aggressive by many. The unit not only accomplished all of its objectives, but it made the round trip without incident.

Seventeen aircraft, 68 crewmembers and 10 support personnel traversed the plains of Kansas, deserts of New Mexico and Arizona, and the mountains of California, logging more than 800 aircraft hours during that 2-week period. Though the usual "prophets of doom" had predicted that unit aircraft would be scattered between Lincoln, Las Vegas and Los Angeles, it didn't happen. All of the aircraft returned without incident, with the exception of one helicopter that had a main rotor blade materiel failure en route the first day. There were also some tired backsides, but that was a small price to pay for this type of success.

This unit was able to accomplish an aggressive undertaking such as this without incident and maintain an accident-free flying program for the eleventh consecutive year. Many wonder if it was due to command emphasis, experienced personnel, outstanding maintenance, sound training programs, attitude or luck. The answer is that it was probably a little of all of these. Eliminate any one item and you read about it in FLIGHTFAX. All of the above ingredients contributed to a successful annual training period for the 24th Medical AAC.

Most of the unit aviators have been flying helicopters for a long time. The average aviator experience level is about 2,000 hours. More than

Lieutenant Colonel Don A. Gross
Director of Aviation, Nebraska Army National Guard

photo by SFC Dennis Sasek

photo by MSG Bill Ervin

ABOVE: Medics of the 24th Medical Company (Air Amb), Nebraska ARNG, stop for chow during Wounded Warrior I at Camp Roberts, CA.

LEFT: Flying over mountainous terrain was the order of the day for 24th Med Company pilots participating in Wounded Warrior I

half of these pilots have combat experience.

Maintenance personnel and crewchiefs have compiled an enviable accident-free record. Stability in the ARNG Technician Maintenance Program provides a strong foundation for the supervision and training of M-Day crewchiefs and maintenance personnel. The airworthiness of the aircraft is probably the bottom line in any aviation safety program. In addition, sound training programs are certainly important. Ft. Rucker has the best program in the world. Aviators graduating from flight school there are proficient and highly motivated when they return to their units. It's at this time that they progress or digress, depending upon command emphasis and supervision of unit training programs.

All of the factors mentioned are certainly important but the one element that is paramount is attitude. Webster defines attitude as "a feeling of emotion toward a fact or state." If we're to instill a positive attitude throughout the unit we must clearly define objectives, maintain high standards and motivate subordinates. This can only be accomplished if there is integrity at every echelon within the unit.

Commanders must insist on adherence to a code of values that promotes an undivided total effort. The individual soldier must realize that his or her personal effort plays a vital role in the prevention of aviation accidents. It's not difficult to identify a unit that has high morale and a positive attitude. It's reflected in the strength of the unit, attendance during drill and annual training, personal appearance, military courtesy and individual productivity. Training records will also reflect maximum progression by aviators in

photo by CPT Rick Semm

A "casualty" poses to demonstrate the realism of the moulaging technique employed to add realism to the medical exercise

The terrain in California was a complete change for pilots of the 24th Medical Company, who are used to the flat lands of Nebraska

accomplishment of aircrew training manual tasks and AAPART (annual aviator proficiency and readiness test) requirements. There will be few waivers required. Maintenance records will be maintained well, deficiencies will be expeditously corrected and aircraft availability will be above average.

Additionally, flight planning will be thorough. Mission, weather and safety briefings will be detailed. Personnel will display a spirit of cooperation and genuine concern and respect for each other and the jobs they have to perform. It's not necessary to detail how to recognize a unit without these attributes. We've all had the misfortune to be associated with one or have followed their escapades in FLIGHTFAX.

Many suggest that the element of luck plays a part in success or failure of a unit. This may be true. How often are instances of incomplete flight planning, inadequate preflights, sloppy maintenance and unauthorized maneuvers observed? We've all witnessed such displays of unprofessionalism. Only the "Grim Reaper" knows why those individuals were spared to fly another day. Although the existence of luck can be acknowledged, it's not something one can consider a very tangible asset. The professional gambler only rolls the dice so many times before he "craps out." It's not something a thinking person should bet his or her life on. Some learn from their mistakes. Others never recover from them.

Being a professional doesn't come easily. Being a nonprofessional requires no work at all. No vacancies exist in ARNG aviation units for the nonprofessional. That's why the 24th Medical Company in Lincoln is working on its thirteenth consecutive accident-free year.

MAJ Julio Molina, commander of the 24th Medical Company (Air Ambulance), Nebraska Army National Guard, displays the California National Guard Medal of Merit awarded him by BG James Simmons III, commander of the 175th Medical Brigade. The award was presented at the conclusion of Wounded Warrior I for outstanding support by MAJ Molina and the 24th Med Company

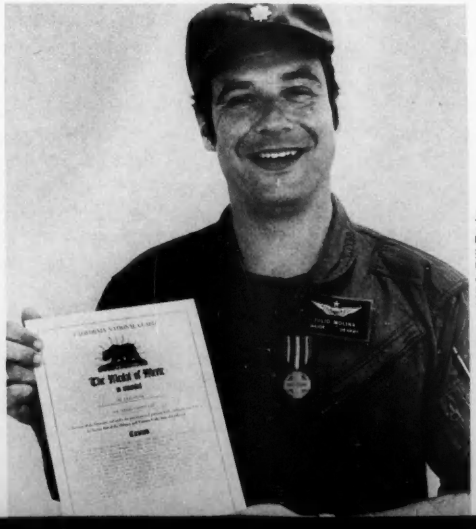


photo by MSG Bill Ervin

"Hangar Talk" is a quiz containing questions based on publications applicable to Army Aviation. The answers are at the bottom of the page. If you did not do well, perhaps you should get out the publication and look it over.

AR 600-105 Aviation Service Of Rated Army Officers

CW2 (P) Gary R. Weiland
Directorate of Training Developments
U.S. Army Aviation Center
Fort Rucker, AL

1. Which category is entitled to hazardous duty incentive pay when on valid orders to perform crewmember or noncrewmember flying duty?
a. Nonrated officers
b. Enlisted members
c. Rated officers
d. All of the above
e. Only a & b

2. Army flight surgeons are "rated officers."
a. True b. False

3. An Army aviator who has less than 3,000 hours total flying time can qualify for the Master Army Aviator aeronautical rating.
a. True b. False

4. An Army flight surgeon must have at least 1,000 hours military flying time as a flight surgeon to qualify for the Master Flight Surgeon aeronautical rating.
a. True b. False

5. An Army aviator must have a current military instrument rating to qualify for either the Senior or Master Army Aviator aeronautical rating.
a. True b. False

6. To qualify for monthly Aviation Career Incentive Pay (ACIP), the annual minimum flying hours for flight surgeons assigned to flying duties are:
a. 24 hours total, to include 4 hours night flying
b. 30 hours total, to include 4 hours night flying
c. 40 hours total, to include 8 hours night flying
d. 60 hours total, to include 10 hours night flying

7. Army aviators who have 108 months total operational flying duty credit at their 18-year gate are entitled to continuous ACIP for the first _____ years of _____ service, if they remain qualified.
a. 22 — aviation
b. 22 — total federal officer
c. 25 — aviation
d. 25 — total federal officer

8. Unless specifically prohibited by a flight surgeon, aviators may operate flight simulators while medically suspended.
a. True b. False

9. Rated officers who are assigned to nonaviation duty positions or have failed to meet gate requirements must take a flight physical each year and maintain current class 2 flying medical fitness standards.
a. True b. False

10. Flying Evaluation Boards may recommend punitive actions.
a. True b. False

ANSWERS

1. e, para 1-3m
2. a, para 1-3r
3. a, table 2-1
4. a, table 2-1
5. b, table 2-1
6. d, para 3-19a
7. b, para 3-4b
8. a, para 3-6f
9. a, paras 3-5 and 3-9c
10. b, paras 4-2a and 4-3b(2)

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The DEW Threat

THE ATTACK TEAM closes to join the battle. An advance scout reports loss of its FLIR (forward looking infrared radar) and television in its mast-mounted sight. Another scout reports his observer experiencing vision problems after using direct view optics in an attempt to identify an unusual hostile vehicle. An attack aircraft moves forward for a better look at the unusual vehicle. As it unmasks, its canopy suddenly is frosted. A mysterious spot of molten metal begins to form on the aircraft's skin. Within seconds, the aircraft crashes. This attack team has just come under an attack from a directed energy weapon (DEW)—in this instance, a laser.

The helicopter that will survive such an attack consists of a reinforced ceramic fuselage to protect against laser attack. Cockpits, per se, are eliminated because of their vulnerability to airborne and ground air defense lasers. Direct view optics are eliminated, forcing pilots to fly completely by instruments to avoid pilots being blinded by lasers. Electromagnetic pulse vulnerabilities in electronics, communications, avionics, fire control systems and weapons guidance force substantial size, weight and cost penalities on the aircraft.

The above scenario may seem to many as farfetched science fiction ramblings. But the fact is, most of what is described below will become a reality much quicker than many soldiers, leaders and combat developers are prepared to accept. This necessity for the soldier to look into technologies that were once confined to the realm of science fiction is being driven by the emergence of a new family of weapons known as directed energy weapons. Today, this generic family contains three major categories: the laser, the non-nuclear electromagnetic pulse/radio frequency weapon (NNEMP/RF) and the particle beam weapon. This article is limited in scope to the discussion of the laser and NNEMP/RF weapons, as those will be the first to have an impact on Army Aviation.

The history of warfare has seen many evolutions in weapons, doctrine and tactics. These changes have sometimes been centuries in coming, others have revolutionized warfare in a single decade. The age of the DEW is rapidly approaching, if not already upon us. Although physically complex, DEWs are similar to conventional weapons in that each causes damage and casualties by depositing energy on the target. Conventional systems use the chemical and kinetic energy of a projectile or fragment to defeat the target. DEWs, on the other hand, depend upon "bullets" of light or electromagnetic waves impacting at or near the speed of light to deposit the necessary energy to achieve the desired damage threshold. It is obvious that the first nation fielding an integrated DEW system will gain a significant advantage on the battlefield. Further scientific developments in miniaturization, electronics, power supply and power switching technology are required to field a tactical DEW system. Such fielding would dramatically alter modern warfare as we know it.

Today's technology in DEWs is difficult to quantify, but there is overwhelming evidence that the Soviets have a viable ongoing program. This point was adequately driven home in the publication *Soviet*

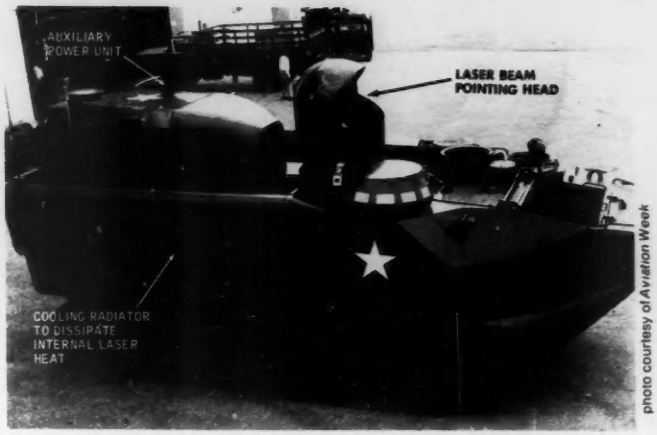
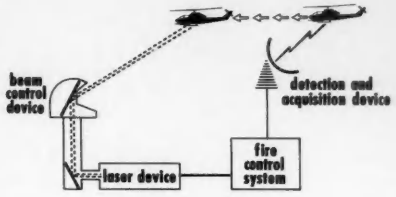

AUXILIARY POWER UNIT
LASER BEAM POINTING HEAD
COOLING RADIATOR TO DISSIPATE INTERNAL LASER HEAT
photo courtesy of Aviation Week

FIGURE 1 (right): Laser Technology Demonstrator.
FIGURE 2 (below): Laser Air Defense Weapon



Military Power. "Over the past years, the Soviet Union is estimated to have taken the lead in the development of high powered lasers and possible radio frequency devices."[1]

The first question asked in many discussions of DEWs is, "What exactly is a DEW and what will be its targets?" First, the targets: Owing primarily to their relatively "soft target" nature, the most likely targets for first generation DEW systems will be aircraft, sophisticated electronics, missiles and their guidance systems, and the human eye. The helicopters on the future battlefield fit into many of these categories. The vision of the pilot, the missiles fired from the helicopter and the aircraft structure or underlying components are all vulnerable to laser weapons damage. All electronics in the aircraft, the fire control systems, avionics and communication equipment, will similarly be vulnerable to NNEMP/RF weapon damage.

Now, to the discussion of what is a DEW. The remainder of this article addresses the laser and the NNEMP/RF weapon.

The Laser

Recognition of the potential of a laser (light amplification by stimulated emission of radiation) device as a weapon was almost synonymous with its inception in the early 1960s. Initial work with a laser weapon produced two major problems for the researcher:

- The ability to generate a laser beam of sufficient power.
- The ability to focus and hold the beam on a specific point on the target long enough.

As research continued much of the initial skepticism gave way to cautious optimism. As power output increased and pointing and tracking accuracies improved, optimism turned to enthusiasm. But many still doubt the ability to produce an effective system within budgetary constraints. If this is true, the logic driving the tremendous outlays for laser weapons research, both Soviet and United States, becomes questionable. The simple fact is that such systems offer capabilities not within the technical parameters of conventional weapons systems, thus justifying a continued research and development effort. For example, the laser spews out billions of tiny "photon bullets" (if you can accept the particulate nature of light as presented by some physicists) at 186,000 miles per second. The "bullets" are of such small mass that destructive power normally is not achievable; however, when propagated in tremendous quantities, destructive powers are generated. The laser weapon has progressed through the feasibility studies and initial engineering design to feasibility demonstrators such as the one in figure 1.

As early as 1973, the Air Force was able to shoot down a winged drone with a laser. In 1976, the Army demonstrated a capability to engage and destroy both fixed and rotary winged drones with a laser weapon. The first test to quiet many of the skeptics occurred when a moderately powered laser destroyed a high-speed antitank missile while in flight.[2] More recently,

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[1] *Soviet Military Power.* Office of the Secretary of Defense. October 1981.

[2] *Aviation Week and Space Technology.* "Laser Weapons." 1978.

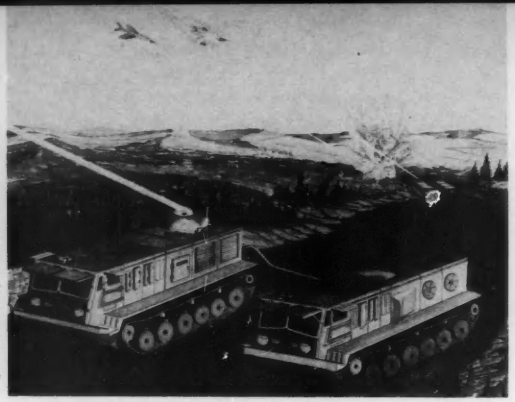

photo courtesy of *Soviet Military Power*

FIGURE 3: Laser Air Defense Weapon

the Air Force has conducted trials using an airborne laser against aerial targets. Having demonstrated laser feasibility and capability in each of these tests, the laser weapon took major steps toward reality as a tactical weapon.

Before continuing, a brief explanation of exactly what a laser weapon is may be in order. A laser beam is produced by excitation of an "active medium" lasing material to an upper unstable energy level. In returning to the lower, more stable energy level, the material will lase or give off energy in the form of light with constant phase and wavelength. With a focusing mechanism directing this light energy in a specified direction, a laser beam is produced.

A successful laser engagement occurs when a specific target has been engaged, and the desired destructive results are obtained. These engagements could range from the simple blinding of combat crewmembers using a relatively low energy laser, or the crazing of optics and physical destruction of electro-optics and other sensors by a medium energy laser (MEL), to the catastrophic burn-through of the target surfaces—resulting in structural failure, vital component destruction, or ignition of onboard fuel and/or ordnance by a high energy laser. A schematic of a laser weapons system is shown in figure 2.

The laser weapon offers many advantages over the conventional rocket or gun system. "The ability to concentrate beams of energy, moving at the velocity of light, so narrow that they overwhelmingly exceed nuclear bomb energy density delivery capability, should be recognized as a weapon achievement with implications every bit as shattering as the development of monstrous, but uncontrolled energy releases of nuclear bombs themselves."[1] Although the tremendous speed of delivery and destructive potential are the paramount advantages, other advantages such as short reaction time, high rates of fire, large magazine capacity and the ability to engage a single target in a target group make the laser weapon an attractive supplement to conventional systems.

Even with all the advantages cited, the laser alone does not offer the necessary capabilities to replace the conventional systems of today. But the laser looms as a tremendous supplement to conventional systems. To achieve the weapon capability attributed to such a system, the laser must overcome some difficult obstacles.

A successful engagement will require the laser beam to be focused on a vital target surface and held on this point for the time required to produce the destructive results (destroy control surfaces, burn through vital components, detonate fuel or warhead, destroy optics, etc.). This requirement dictates a pointing and tracking ability to not only place the beam on the target, but also on a specific point on the target and then hold it there for seconds, or fractions of seconds, regardless of target movement. This pointing and tracking problem loomed paramount in early laser weapon research, but the successful destruction of an inflight high-speed antitank missile clearly demonstrated that present state of the art in pointing and tracking is compatible with laser weapon development.

Initial laser power outputs were insufficient to obtain effective ranges necessary for weapons applications. But lasers with outputs suitable for weapons application are available today. Though still not sized, hardened or weight reduced to meet a tactical weapons requirement, only packaging the system remains before a viable laser weapon can be fielded.

Another major hurdle the laser weapon must overcome is attenuation by the atmosphere and battlefield turbulence. The laser, like any other light beam, tends to be dispersed by fog, precipitation, dust and other atmospheric conditions. Compensation for decreased intensity must come in either increased power output or increased dwell time on target. Work on laser propagation through air continues with the real utility of a laser weapon dependent upon propagation through fog, rain, smoke, haze, battlefield turbulence and obscurant aerosols.

The Nonnuclear EMP/Radio Frequency Weapon

For many years, electromagnetic pulse (EMP) has been recognized as a phenomenon associated with a nuclear detonation. The destructive potential of nuclear EMP warranted research into use of nuclear weapons primarily for the EMP associated damage. The research continued for many years in the use of nuclear EMP against enemy electronics with simultaneous efforts focused on hardening friendly systems to make them less susceptible to EMP damage. The EMP weapon

[1] *Aviation Week and Space Technology*, 16 October 1978.

receiving all the publicity today is similar in effects to the EMP generated by nuclear blast, but with one major difference—it is generated without a nuclear detonation, thus nonnuclear EMP or NNEMP/RF.

EMP is a short-lived, intense, electromagnetic wave consisting of a single or multiple oscillation. It may enter a system through numerous entry points such as antennas, aircraft skin, air vents, cables or defective shielding. In fact, any metallic object immersed in a strong transient electromagnetic field will have electrical currents and charges induced on its surface.

Component damage results when these induced transient currents are transmitted into internal circuits. Circuit upset, defined as a generation of erroneous data or loss of memory or logic as a direct result of a reversible response to EMP transients, occurs at relatively low induced energy levels with permanent damage occurring at higher levels.

As aircraft electronic devices become more sensitive and sophisticated and packaged in lighter weight materials, the more susceptible such circuits are to EMP damage. This damage is manifested in either temporary circuit upset, tripping circuit breakers, erasing computer memory, error inducement, or permanent circuit damage due to component burn-off.

The NNEMP/RF weapon, as other DEWs, offers numerous advantages over conventional munitions. The major advantage being the ability to severely degrade the enemy fighting capability without the requirement to actually physically destroy his aircraft, tanks and ships. The NNEMP/RF weapon offers speed about the same as a laser, a broader beam encompassing larger target areas, longer and less weather dependent range, and frequency option to complicate countermeasures.

On the disadvantage side, the NNEMP/RF weapon poses three primary challenges to the user. These include limiting damage to friendly systems, accurate damage assessment, and the possibility of effective countermeasures being developed.

The physical nature of an NNEMP/RF beam endangers all systems along its path. Any friendly systems in the way of the beam, or located in the hazard area of the antenna's side or back lobe, are susceptible to unintentional damage.

Accurate damage assessment will be difficult to impossible. Unlike explosive weapons, the NNEMP/RF weapon could have critically damaged a system without causing any visible external results. The notable exception would be in the case of an NNEMP/RF weapon engaging an inflight missile. Success in destroying the missile guidance or seeker could be assessed by the behavior of the missile subsequent to engagement.

The capability to field DEWs has been hotly debated within the U. S. intelligence community. The evidence is overwhelming that the Soviets are expending tremendous efforts in the development of the necessary technologies to field DEW systems. The Soviets' purpose in fielding such weapons is not clearly defined, but Secretary of the Navy John Lehman stated it this way: "The purpose, beyond capitalizing on the value of Clausewitz's 'Element of Surprise,' is to enhance relative advantage and increase the enemy's uncertainty. Throughout history, unpredictability and a novel approach have played decisive roles in myriad events. It is a potential that we can ill afford to ignore."*

It is clear that the Soviets have created uncertainty in the intelligence community and apparently have gained a relative advantage in the DEW field. The time is at hand where we must take the necessary steps to begin developing the countermeasure to ensure survivability on the future battlefield.

It is obvious that today, more than ever before, it is an absolute necessity that leaders, planners and decisionmakers at all levels have an accurate appreciation and understanding of what directed energy is and what it is not. The future battlefield will require sufficient knowledge of the theory and application of DEWs to properly employ the helicopter as described in the opening scenario, train the pilot that flies it, develop defensive countermeasures, and employ offensive DEWs. The task is not as awesome as it may seem, provided the process is started now.

*Strategic Review, Summer 81 by Dr. John F. Lehman Jr., Secretary of the Navy.

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Department of the Army
AVIATION UPDATE

Brigadier General Ellis D. Parker

Army Aviation Officer
ODCSOPS, Headquarters,
Department of the Army

DURING THE past several months I have been privileged to participate in several conferences where aviators have gathered to evaluate Army Aviation from top to bottom. As ideas were shared and many issues addressed, I was continually impressed by our resolve to ensure Army Aviation remains a strong combat multiplier on future battlefields. We draw strength from each other during these times together, along with renewed energy to continue improving our capability to fight as a full member of the combined arms team.

Communication is vital to our efforts, and this update is intended to be part of that process. I have included brief comments in the areas of safety, training and standardization, aviation systems, Reserve Component activities and personnel.

Safety

• **Accident Prevention.** Now that we have had some time to reflect on FY 82, I thought it appropriate to begin this first FY 83 update with some thoughts on safety. Our accident prevention effort in Army Aviation has, over the past 25 years, met with considerable success. This is evidenced by a continuing drop in the accident rate per 100,000 flying hours from 54.3 in FY 58 to 2.31 in FY 80.

• **FY 81/FY 82.** However, statistics for the past 2 years indicate an undesirable upward trend. FY 82 was the worst in several years. During FY 82, 70 percent of all Class A aviation accidents were caused by human error. Crew and supervisory error contributed to 80 percent of the human error accidents. Our aviation accident experience for the last 6 years looks like this:

	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82
Class A Mishaps	48	47	39	37	43	59
Mishap Rate (100,000 Flying Hrs)	3.20	3.24	2.70	2.41	2.63	3.71
Fatalities	26	58	18	26	29	86
Total Flying Hours	1.5M	1.4M	1.4M	1.5M	1.6M	1.6M
Total Mishap Costs	$32.1M	$34.1M	$43.2M	$34.7M	$32.8M	$56.1M

• **Our Current Aviator Force.** When compared to previous years, we have a relatively young aviator force. But inexperience is not our problem. The "typical" aviator involved in an FY 82 accident had 4.3 years of aviation service and 1,300 flying hours. Our FY 82 accident record cannot be attributed to lack of experience or individual proficiency, but acts of omission and commission that demonstrate disregard for flight discipline. I know we can, and must, do better—and so do you. We don't need to fix what is not bent or broken. But we do need to attack deficiencies and correct wrongs where they exist. It is incumbent on all of us to reverse the trend for FY 83.

• **CH-47 Fleet.** We are making good progress on getting our CH-47 fleet back into service. There are operational aircraft now in every MACOM; and within the very near future, we expect to reach an intermediate goal of two aircraft operational in every CH-47 company. It has taken the total support of the entire "aviation team" to identify the problem, work out the solution, and get the effort underway in the field.

• **Safety Coordinating Committee.** We have recently formed a Safety Coordinating Committee at Department of the Army under sponsorship of the Deputy Chief of Staff for Personnel. Membership includes key aviation managers from all Army staff agencies. This committee was formed to facilitate

timely staff actions at Department of the Army level relating to the Army's accident prevention program and to serve as a forum to communicate the emphasis placed on safety by the top leaders in the Army. The committee is chaired by MG John H. Mitchell from ODCSPER and includes Mr. Joe Cribbins (ODCSLOG), BG Richard D. Kenyon (ODCSRDA), myself, and representatives from the National Guard Bureau, Army Reserve and the Office of the Surgeon General.

Training and Standardization

• **Training Symposium and Policy Committee.** The annual Aviation Training Symposium and Policy Committee meeting was held at Fort Rucker this past November (see "Reporting Final," page 32, November 1982 *Aviation Digest*). It was a very productive week for all who attended, as it is every year. One of the great strengths of Army Aviation is our standardization program. It is strong because of the efforts of everyone of you who are actively involved in it, from the local standardization boards to the policy committee itself. This year, many of your commanders and the MACOM aviation officers conducted a thorough review of the entire Aircrew Training Manual program. I know that they will be updating you on the results, as will the *Digest* in subsequent issues. It was a real pleasure to have our vice chief of staff, General John A. Wickham Jr., speak to the group at a AAAA luncheon during the week. His thought-provoking talk on aviation safety and training was the highlight of both the Training Symposium and the Policy Committee meeting (see "Reporting Final," page 14 of this issue).

• **AR 95-1.** The new AR 95-1, dated 15 November 1982, has been printed and is now being distributed to the field. Considerable effort has gone into the rewrite of this regulation, which should prove helpful to every Army aviator and every aviation unit. Note especially, the section on the use of Army aircraft and operational support airlift, which is completely new this year. I recommend that you read the DES Report To The Field in this issue of *Aviation Digest,* page 20. It presents an excellent review of the new AR 95-1.

Aviation Systems

• **UH-60A Black Hawk.** Fielding continues at the rate of around 100 aircraft per year. As FY 82 ended, 321 aircraft had been distributed to CONUS and USAREUR units. We now look ahead this year to continued fielding in USAREUR and next year in Korea. A near-term improvement planned for the Black Hawk is the External Stores Support System (ESSS), which will add extended range and improved tactical deployability to the already outstanding capabilities of this aircraft.

• **CH-47D Chinook.** The first of 436 new "D" models is scheduled for delivery to its new unit in March 1983. Modernization efforts will continue over the next 9 to 10 years to replace CH- 47 A, B and C helicopters.

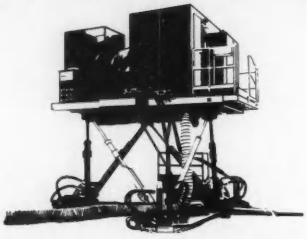
• **AH-1S Cobra.** Fielding of the fully modernized AH-1S to USAREUR continues and is progressing on schedule. The Army continues to evaluate a variety of options to upgrade the older AH-1 models and to extend their life to the year 2000.

• **AH-64 Apache.** The AH-64 is the Army's top priority aviation program, and has recently completed an extensive developmental flight test program of more than 4,000 hours. The new assembly facility at Mesa, AZ, was occupied in December 1982, 2 months ahead of schedule. The first aircraft begins movement down the assembly line in March 1983 with the first of 515 production Apache aircraft to be delivered to the Army in February 1984.

• **AHIP.** Our near-term improved scout aircraft is expected to begin entering the inventory in FY 86. Priority of distribution of the aircraft will be to modernized attack helicopter units. Operational testing is scheduled to begin in September 1984 at Fort Hunter-Liggett, CA.

• **JVX.** All services are proceeding with the Joint Services Advanced Vertical Lift Aircraft program. Current requirements call for joint development of a multimission aircraft for the 1990s and beyond. The aircraft is expected to employ tilt-rotor technology in performing such missions as airborne intelligence and electronic warfare, medical evacuation, search and rescue, special operations and assault vertical lift. The Army is designated as the executive service for this joint program.

• **LHX.** Extensive coverage of the LHX program appeared in the December 1982 issue of the *Aviation Digest* and continues this month, starting with the next article, "Army Aviation's Entry Into The Future: The LHX." The advanced technology development program continues for a light helicopter family (LHX), with an attack version to eventually replace the AH-1 and a light utility version to replace the UH-1 and OH-58. The referenced LHX articles are well prepared and I highly recommend that you read them.



• **Simulators.** The Army's simulator program is moving ahead, with a wide range of simulators scheduled for fielding throughout the 1980s. This chart depicts projected fielding dates and locations.

LOCATION	FY 84	FY 85	FY 86	FY 87	FY 88	FY 89
Fort Hood	AH-1			AH-64 UH-60		
Hanau, Germany	AH-1			UH-60 AH-64		
Fort Campbell	AH-1	UH-60	AH-64			
Illesheim, GE		AH-1		AH-64	UH-60	
Fort Lewis		AH-1	CH-47			UH-60
ARNG Trng Center (Indiantown Gap)				AH-1		
Fort Bragg				UH-60		
Fort Rucker		AH-64		AH-1		
ARNG Trng Center (Phoenix)				AH-1		
Korea				CH-47		
Hawaii					UH-60	

Reserve Components

• **Army National Guard (ARNG).** Recent decisions by the ARNG will significantly change its attack helicopter program. AH-1 aircraft will be redistributed to attack helicopter companies and troops by model, to preclude having a mix of different models in the same unit. To achieve maximum training and readiness capability, aircraft fill for each unit will be reduced from 21 to 15. The UH-1M/C gunships now in these units will become the basic aircraft of the air cavalry troops only. To support its new program, the ARNG has developed a phased training program to get the right mix of qualified aviators into each unit.

• **Army Reserve (USAR).** The USAR and FORSCOM have begun a test of the recently developed Battle Rostering program. Battle Rostering involves the "assignment" of Individual Ready Reserve (IRR) aviators to a specific active component aviation unit for training and in the event of mobilization. The goal of the program is to bring each CONUS aviation unit up to ALO 1 (authorized level of organization) while at the same time offering a "home" and better training for those aviators who have left active duty but desire to continue flying as part of the Army Reserve program. Battle Rostering will be tested at Forts Stewart, Hood, Bragg and Lewis this year.

Personnel

• **Commissioned Aviator Management.** It is important for all aviators to know who their assignment managers are and how to communicate with them. Here are their names and phone numbers:

AVIATION MANAGEMENT BRANCH (SC 15)

221-7822/9366

LTC Ron Adams - Branch Chief
MAJ Dave Hicks - Lieutenant Colonels
MAJ Steve Devault - Majors
MAJ Gary Steimle - Majors
MAJ Vic Sathre - Company Grade (overseas)
MAJ Paul Whitaker - Company Grade (CONUS)

TRANSPORTATION BRANCH (SC 71)

221-8112/8120

LTC Roy Berry - Branch Chief/Lieutenant Colonels
MAJ Harry Curry - Majors
MAJ (P) Rick Fields - Captains
CPT (P) Jim Whalen - Lieutenants

MEDICAL SERVICE CORPS (SC 67J)
LTC Tom Scofield 227-1469

COLONELS' DIVISION
LTC Gene Grimsley 221-7867

• **Aviation "Gates."** The Army has been under the "gate" system established by the Aviation Career Incentive Act for 8 years now. With the changes in aviator management that have taken place in the last few years, it is interesting to see how aviators stand in relationship to their 12 and 18 year gates. Shown here are the number of aviators who were eligible for and met their gate requirements during FY 82:

	12 YEAR GATE			18 YEAR GATE		
	Eligible	Passed	%	Eligible	Passed	%
Commissioned	370	262	70%	135	77	57%
Warrant	641	631	98%	70	64	91%

• **Warrant Officer Aviator Management.** Since aviator management in Warrant Officer Division changed from an "area" system to a "speciality" system in January 1981, we have seen considerable improvement in how aviators are trained and assigned to meet Army requirements worldwide. Warrant officer aviators should also know who their assignment managers are and how to contact them.

CW4 David Helton - Assignments Branch Chief -221-7835/36
CW4 Larry Morgan - 100Q, 100R, 100C, 160A - "
CW3(P) Chris Vermillion - 100A,100B (overseas), 150A—"
CW4 Grant South - 100B (CONUS), WO Candidates - "
CW4 Lloyd Washer - Professional Development Branch Chief -221-7843/44
CW4 Ken Johnson - Career Schools

It is encouraging to see that our warrant officer aviator retention (at the end of the first obligated tour) has increased from 45 percent in FY 79 to 60 percent in FY 82. The whole aviation community has actively identified and pushed for implementation of many initiatives to improve the warrant officer aviation program. It is obvious that these efforts have paid off. We all need to "advertise" the improvements. One way to do this is to be aware of those sharp soldiers who work for us and encourage them to consider the challenges of becoming an Army aviator through the Warrant Officer Candidate program.

What I have been able to update you on really just scratches the surface of aviation activities at DA level. Nevertheless, I trust the effort communicates to each of you my concern for providing assistance from here that helps you to get the job done better wherever you are. Let me hear from you!

How can I get the ...

UNITED STATES ARMY
AVIATION DIGEST

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Light Helicopter Family

LHX

Army Aviation's Entry into the Future

Colonel Robert S. Fairweather Jr.
TRADOC Systems Manager, Scout Helicopters
U.S. Army Aviation Center
Fort Rucker, AL

"The speed of the aircraft and the power and long range of fire make up the material base of the offensive. An advantage in these components always [gives] a pilot freedom to select the maneuver and the direction of attack."

COL V. Babich, Soviet Air Force

THE quote on page 34, from the translation of an article in a Soviet magazine, is an appropriate beginning for this discussion of a conceptual future U.S. Army aerial vehicle. The scout/attack (SCAT) version of the Light Helicopter Family (LHX) will be a new system that is, in fact, designed to give pilots the proper equipment so that they can assert themselves in combat. As you read what I have to say about the LHX program, it is important for you to keep in mind that nothing is yet locked in concrete and it is still possible to influence the final product. In other words, *now is the time to contribute your ideas.*

The LHX program is in the initial (concept definition) stage of combat and materiel development and is designed to provide the Army with a new fleet of aerial platforms. This new fleet will replace existing helicopters that are expected to become obsolete in the 1995 and beyond timeframe. Specific helicopters that may be replaced are the UH-1 Huey, the OH-58 Kiowa, the OH-6 Cayuse and the AH-1 Cobra. Although these helicopters currently fill the bulk of the Army Aviation inventory, and will continue to do so for the next decade, they do not possess the technology required to meet the full demands of Army Aviation's AirLand Battle 2000 roles.

The basic concept of the LHX program is to develop a family of light aerial platforms that share as many common components as possible while retaining configurations that best meet mission needs. Although the acronym LHX includes the word "helicopter," the program scope is actually broader and will consist of a look at a number of alternatives, such as tilt-rotor aircraft. The vertical lift technology associated with the LHX will provide commanders with enhanced aviation capabilities in the following critical areas: greater endurance; increased dash speed; adverse weather, day/night nap-of-the earth (NOE) capability; jam resistant NOE navigation and communications; countermeasures mission support equipment including electro-optical, radar, acoustical and infrared; nuclear, biological and chemical hardening and crew protection; strategic mobility; maintainability; standoff reconnaissance, surveillance and advanced target acquisition systems; and enhanced weaponry. The LHX will be able to take advantage of emerging technological gains in aeromechanics, propulsion, structures, aviation electronics, weapons, countermeasures, mission support equipment and systems integration. In short, the LHX program will pull together the products of numerous aviation technology programs geared toward maintaining an edge over the future threat.

Conceptually, there would be two basic versions of the LHX. The first version would be a light scout/attack platform that could be rapidly configured in the field as a scout, armed scout or light attack aircraft. The second version would be a light utility/observation (LTU/LOH) platform that could be employed in either role without modification.

The SCAT would initially replace OH-58 scout helicopters, and eventually would replace the AHIP (Army Helicopter Improvement Program) when it reaches the end of its useful service life. Further, SCAT is envisioned to ultimately be the only aerial platform in future air cavalry units, replacing the OH-58, AHIP scout and the AH-1S attack helicopters. The concept of a pure SCAT air cavalry troop is very promising because it will provide the commanders with a number of benefits. First, they will be able to tailor their teams with aircraft configured to meet specific mission requirements. For example, if they intend to accomplish armed reconnaissance missions, they might heavily arm all of the aircraft. However, if the team is screening a relatively secure flank, the aircraft may only be lightly armed with self-protection weapons. The options would vary from unarmed scouts to light attack birds, or anything in between.

Second, the SCAT troop concept would offer air transportability benefits. Fewer lift sorties would be required to move the smaller aircraft and, because the LHX would be designed with air transportability in mind, preparation and load/unload times would be reduced. Third, overall logistics support certainly would be reduced for the SCAT troop since it would have only one type of aircraft. At the same time, the platform itself would incorporate RAM (reliability, availability and maintainability) characteristics that would significantly ease the logistics burden, especially in the area of maintenance.

Doctrinal missions, roles and employment of the SCAT troop would vary little from those now identified for conventional air cavalry troops. Troop commanders would still configure teams based on METT+T (mission, enemy, troops, terrain + time), which would accomplish reconnaissance, surveillance, battlefield information collection and economy-of-force missions. From a tactical standpoint, however, a SCAT troop commander would adjust the team's firepower by adding armament to each aircraft on the team, rather than by adding or subtracting the number of attack helicopters assigned to the team.

The new technology built into the SCAT LHX would greatly enhance the team's overall combat capability. The visionic systems will allow for true standoff distances from the enemy, will permit the acquisition of targets at virtually all ambient light and obscurant levels, and will

be fully integrated to provide for rapid, accurate firing of the weapons systems. The range and speed improvements will permit rapid reaction of the troop against the enemy second echelon or at distant locations within the maneuver force boundaries. The speed, agility and armament systems also will give the platform a significant air-to-air capability against threat helicopters and ground attack fighters. If you visualize a large-scale threat surprise airmobile penetration deep into the corps rear area, you can see the obvious value of a SCAT troop that can speed to the scene, eliminate the escorting attack helicopters, shoot down the troop/cargo helicopters and direct fires against those enemy forces already on the ground. Once the situation is under control, the troop can then move swiftly to another area of the battlefield for a new mission.

The SCAT aircraft will further extend the troop's capabilities by having sufficient power to operate in mountainous terrain, even under hot-day conditions. Figure 1 provides the characteristics of the SCAT LHX in this and other areas of interest. As I stated earlier in the article, the program is still in the conceptual stage so what you see in the figure is just a rough estimate that will be refined as the program progresses. Figure 2 portrays a conceptual SCAT aircraft, but shows just one of many options. Another option could be an aircraft similar to the one shown in figure 3.

In the far-term, the SCAT LHX would replace the AHIP as the scout on AH-64 Apache attack helicopter teams. Possessing technology far advanced beyond that of the AHIP, it will be a superior scout fully compatible with the AH-64. With a wide range of armament options, it will immediately respond with lethal firepower against enemy systems (to include helicopters) that threaten the team's security and will augment the antiarmor firepower of the AH-64. Because it will be a "shooter," the enemy will have to worry about it, thus relieving some of the pressure against the AH-64.

The LTU/LOH version of the LHX will not be involved in the direct fire support role of its SCAT brother (sister, for the female reader), but it will be just as important to Army Aviation. It will replace the UH-1 helicopters that accomplish light tactical utility and cargo missions. In no way will it be a replacement for, or compete with, the UH-60 Black Hawk.

As you can see from the conceptual characteristics described in figure 4, the LTU/LOH will possess the same basic performance and survivability parameters as the SCAT and will be a very versatile aircraft. Since it will share many common components with the SCAT, it should enhance aviation logistical support and be very cost effective. The troop and cargo capability will be ideal for the intended missions, which could range from command support to movement of special forces teams into lightly defended enemy rear areas. The LTU/LOH will be extremely valuable as a command and control platform for aviation and maneuver commanders because of its survivability, mobility and space/payload capability. Commanders will be able to bring key staff officers with them, have a full set of communications onboard, and be able to cover great distances with the minimum loss of time. Further, the

Figure 1: Scout/Attack (SCAT) Configuration

PARAMETER	CONCEPTUAL PERFORMANCE
Airspeed	180 to 300 Knots
Endurance	3+30 Hrs (Incl Reserve)
VROC	500 FPM at 4,000'/95°F
Payload	1000 Pounds (Weapons)
Weapons	Hypervelocity Rockets Fire-and-Forget Missiles Automatic Cannon FOGM Air-to-Air Missiles 2.75" Rockets Laser
Survivability	Low Observable/Acoustic Signature
NBC Protection	Hardened/Protected
Self-Deployment	Worldwide
Transportability	C-141 (w/o Disassembly)
Crew	1 or 2 Persons

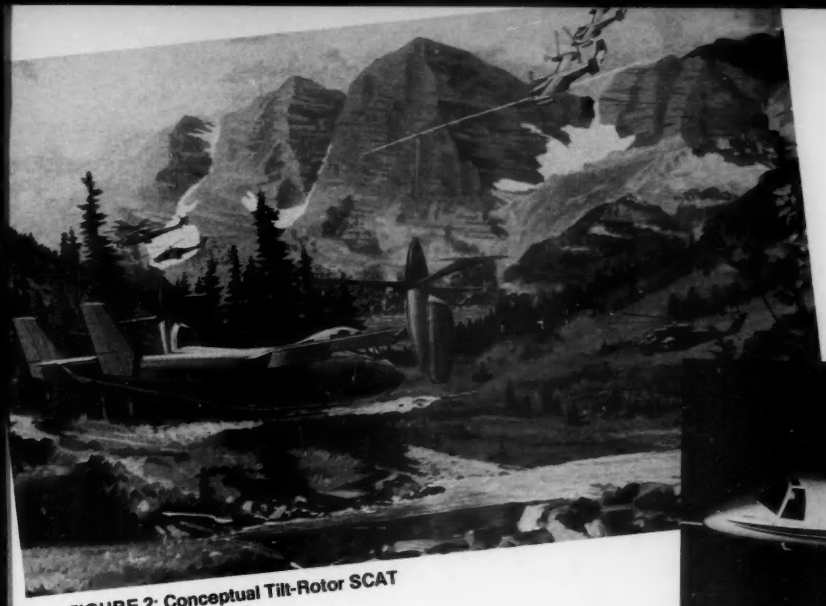


FIGURE 2: Conceptual Tilt-Rotor SCAT

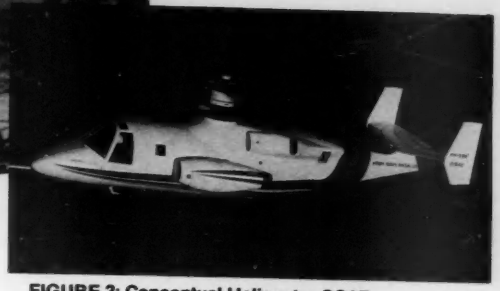


FIGURE 3: Conceptual Helicopter SCAT

aircraft will be armed to protect itself, will be able to work around-the-clock in all terrain and weather conditions, and will be suited for NOE flight within the close combat zone. These characteristics will, of course, contribute toward the accomplishment of other missions.

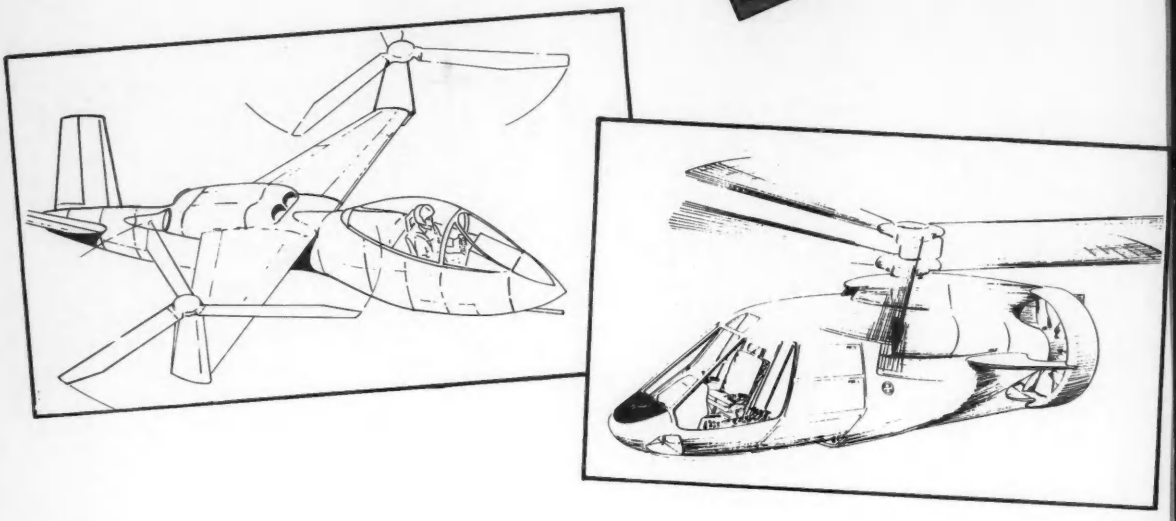
Do not expect to see either the SCAT or LTU/LOH version of the LHX appear overnight, because we are talking about a program intended to meet needs well out into the future. If we start full-scale engineering development too early we may miss out on some promising technology. Further, the Army cannot easily afford to embark on a major developmental effort while still trying to field the AHIP and AH-64. Another important consideration is that we need to draw from lessons that will be learned from air cavalry troop light combat helicopter testing and from operational employment of our revolutionary new attack and scout helicopters. The challenge will be to field an LHX with technology superior to that of the threat, but in time to meet growing force structure and fleet replacement requirements. As the next major Army aircraft program on the horizon, it should be of prime concern to all Army Aviation personnel.

FIGURE 4: Light Utility/Observation (LTU/LOH) Configuration

PARAMETER	CONCEPTUAL PERFORMANCE
Airspeed	180-300 Knots
Endurance	3+30 Hrs (Incl Reserve)
VROC	500 FPM at 4,000'/95°F
Payload	6 Combat Troops or 2,000 Pounds
Weapons	Air-to-Air Missile Automatic Cannon 2.75" Rocket
Survivability	Same as SCAT
NBC Protection	Same as SCAT
Self Deployment	Same as SCAT
Transportability	Same as SCAT
Crew	1 Pilot (Provisions for Copilot)

Light Helicopter Family

LHX



Why Not an LHX?

Mr. Joseph P. Cribbins
Special Assistant for Aviation Logistics
Deputy Chief of Staff for Logistics
Department of the Army

I HAVE WORKED with the Light Helicopter Family (LHX) program, attended many briefings on LHX and have seen and reviewed nearly all supporting documents. In each case, the question has been asked, "Why an LHX?" I am going to reverse this question by asking, "Why not an LHX?"

Over the years (would you believe 42 with the Army) I have seen the entry of many new weapons systems. In those 42 years, the Army has gone from Horse Cavalry to scout helicopters. Surprisingly, though, not too much has changed in cavalry tactics; except that Air Cavalry now has a vertical, over-the-top capability never envisioned in the days of Horse Cavalry. During this time, I have seen and participated in the introduction of many of the helicopter weapons systems we now take for granted. Too often these aircraft have, like Topsy, "just growed." Having just growed, they also have presented many problems in support that have adversely impacted on reliability, maintainability, readiness and costs. We now have the

opportunity to develop and field a highly cost-effective family of helicopters that will be able to accomplish utility, scout, attack and other vertical lift missions as we enter the 21st century.

Let me recount some of my reasons for asking, "Why not an LHX?"

We now have 3,300 UH-1 Hueys in the inventory. These are 1950's state-of-the-art aircraft with many product improvements. The Huey has been a real winner, having operated well in excess of 20 million flying hours, many of these in combat in Vietnam. It has literally become the Gooney Bird (C-47) of helicopters. Like the Gooney Bird, its time is bound to come. By the year 2000, the fleet will average more than 30 years of age.

We have 2,400 OH-6 Cayuse and OH-58 Kiowa observation/scout helicopters in the inventory. These too will average 30 years of age by the year 2000. While we have modified some OH-58s to the OH-58C configuration to improve performance in the scout role, this is not the end-all answer to our need for a modern aerial scout by the year 2000.

We have 1,100 AH-1 Cobras, currently in five series. The AH-1 is a modified UH-1 which entered the inventory in the mid-1960s. We are now working on a program to standardize the AH-1 into a maximum of two series and to upgrade its capabilities as an attack helicopter. However, here again we will have by the year 2000 an aircraft with an average age of about 30 years.

Importantly, if we look at economic and affordable production rates for an LHX to replace current utility, scout and attack helicopters, many of these aircrft will be up to 50 years of age at the time of their retirement.

Now, let me address supportability. I ran a check on just the engines and transmissions for UH-1, OH-6, OH-58 and AH-1 helicopters. In round figures, there are 9,500 engines and 8,100 transmissions installed and spare, with a replacement value of $2.9 billion—not peanuts. Importantly, there are 16 different series engines and 15 different series transmissions. These statistics highlight the problems entailed in management, control, accountability and support of just the engines and transmissions for about 6,800 aircraft—quite a job—and costly.

The point is that the commonality, uniformity, standardization and interchangeability realized in having a family of LHXs with the same engines, transmissions and other major components and repair parts, can greatly ease the burdens of inventory management and costs of operation and support. We recognize that mission equipment packages will vary in the LHX, but this will be necessary no matter what the configuration of the aircraft in order to accomplish the unique missions required of each helicopter system.

The operating and support (O&S) costs are ever important. They are recurring and last the life of the helicopter. For our current helicopters, using just materiel support for 300 flying hours per aircraft per year, O&S costs for 20 years range from four to six times the original procurement cost of the helicopter.

In the LHX, we are looking for a family of helicopters that will provide:

- Commonality and interchangeability of engines and major components.
- Reduced fuel consumption from an advanced technology engine with resultant savings in energy and increased range and loiter time.
- Increased safety and survivability through the use of composites and other new materials.
- Increased reliability and maintainability.
- Decreased maintenance and training requirements.
- Increased flying hour and mission/sortie rates.
- Increased readiness rates.
- Decreased operating and support costs.

The LHX promises many things to the Army. For example, a family of about 6,500 LHXs that can accomplish missions of the helicopters being replaced offers much greater effectiveness, better safety and reliability, reduced maintainability and support—and again, reduced costs.

Here are the pros and cons of an LHX as I see them:

- Without an LHX, the Army will be faced with one of two alternatives: extend the life of current helicopters, or develop a different helicopter for each of the three major missions (attack, utility and scout).
- Under the first alternative current helicopters will have outlived mission effectiveness; will have become a major problem to support; and will have greatly increased operations and support costs.
- The second alternative would require designing, developing, procuring and fielding a discrete mission design series of helicopter for each of the utility, scout and attack missions. This would mean: extensive research and development and procurement costs; increased operations and maintenance training base; increased support base of peculiar parts, tools; test, measurement and diagnostic equipment and ground support equipment; and increased life cycle O&S costs.

Here again, I would ask, "Why not an LHX?"

Army Aviation Training of the Future

Lieutenant Colonel Glenn R. Allen
Chief, Emerging Systems Division
Directorate of Training Developments
U. S. Army Aviation Center
Fort Rucker, AL

INSTITUTIONAL aviation training may undergo significant changes in the future if the Light Helicopter Family (LHX) becomes a reality. Currently, the Army Aviation inventory is made up of a variety of aircraft, and the number of different types will increase with the addition of the AH-64 Apache and AHIP (OH-58 Army Helicopter Improvement Program). This mix of aircraft impacts on the training base. Not only does the training base require a variety of aircraft to use in training, but each aircraft has to have its own unique simulator and training devices. It is easy to see the training benefits of a generic aircraft such as the LHX. The basic concept is to build an aircraft with common dynamics that can be used for scout, utility and attack missions. Such an aircraft, using appliques to suit a particular mission role, has a potential to revolutionize training.

A training version of the LHX could become the primary flight trainer replacing the TH-55 Osage in the mid-1990s. It is within the capability of emerging technology that initial entry students may learn to

hover using a training device that does not even fly; learn to relate to basic flight instruments in a simulator; learn startup, emergency and shutdown procedures in a procedures trainer; and then move directly to the training version of the LHX for primary training. Following the primary phase of flight training, the real training benefit of a generic aircraft could be realized. The student could graduate to advanced flight training and instrument training using the same aircraft, instead of moving from the TH-55 to the UH-1 Huey as is the current requirement. Then, using the multitrack concept, the student could move into a scout, utility or attack version of the LHX for mission and tactical qualification. But again, the student would be flying basically the same aircraft instead of transitioning to an OH-58, AH-1, AH-64, etc. Granted, new tactics and techniques would have to be mastered in the tactical phase, but there would not be extensive time needed to learn a new aircraft from the bottom up. The outcome of a generic aircraft would quite likely be a better tactically trained aviator in a shorter period of time.

Simulation will almost certainly play a large role in training LHX aviators. The AH-64 Apache (and probably the attack version of the LHX) will employ weapons systems that exceed the current capability of most training ranges. Ammunition costs continue to rise, restricting the amount of ammunition available for routine training. The Apache and the LHX will have a 24-hour-a-day capability and will be able to operate in restricted weather conditions. Institutional and sustainment training programs will have to address these requirements, and simulators will play an important role.

The shortage of adequate ranges and maneuver areas, the high costs of fuel and ammunition, the requirement to operate during periods of reduced visibility, combined with the sophistication of emerging systems, stress the need for advanced simulation techniques to fully train future aviators. Simulation is becoming increasingly important as a means to:

- Improve training while reducing operating costs.
- Routinely and effectively replicate a realistic threat array and a dirty battlefield.
- Allow extensive, safe training in a reduced visibility environment.
- Provide virtually unlimited weapons engagements for individual, crew and team training.

LHX simulators should provide sufficient realism so that aviation crews and teams can complete a simulated combat mission feeling they have really been to war. The training developers, through early coordination with the combat and materiel developers, will strive to have the entire training package (including simulators and devices) available at the same time as the aircraft.

It is obvious that if the LHX becomes a reality, the training program envisioned above will not evolve overnight. The training base would expand slowly as the LHX training program would be small initially, and the Army will have an inventory of other aircraft requiring trained crews for many years. But over time, as the number of LHX airframes increased, other programs would decrease in intensity until the majority of training conducted at the institution would be in the LHX. There will always be other training requirements for specialized aircraft such as medium or even heavy lift helicopters and perhaps fixed wing, but the majority of the training effort could one day be directed toward a generic aircraft such as LHX. Supporting this training, in both the institution and the field, will be a large number of simulators and devices such as part-task and procedural trainers. Since they would support one aircraft, they could be purchased in greater numbers for less cost than is now possible. If the generic concept proves viable and is fully developed, it will have a significant, positive effect on training requirements for Army Aviation.

From the training developer's standpoint, the generic aircraft concept makes uncommonly good sense and will be both cost and training effective. The thoughts expressed in this article are, of course, conceptual; but the LHX concept appears to offer significant potential for lowering both the cost and time required to train combat ready aviators.

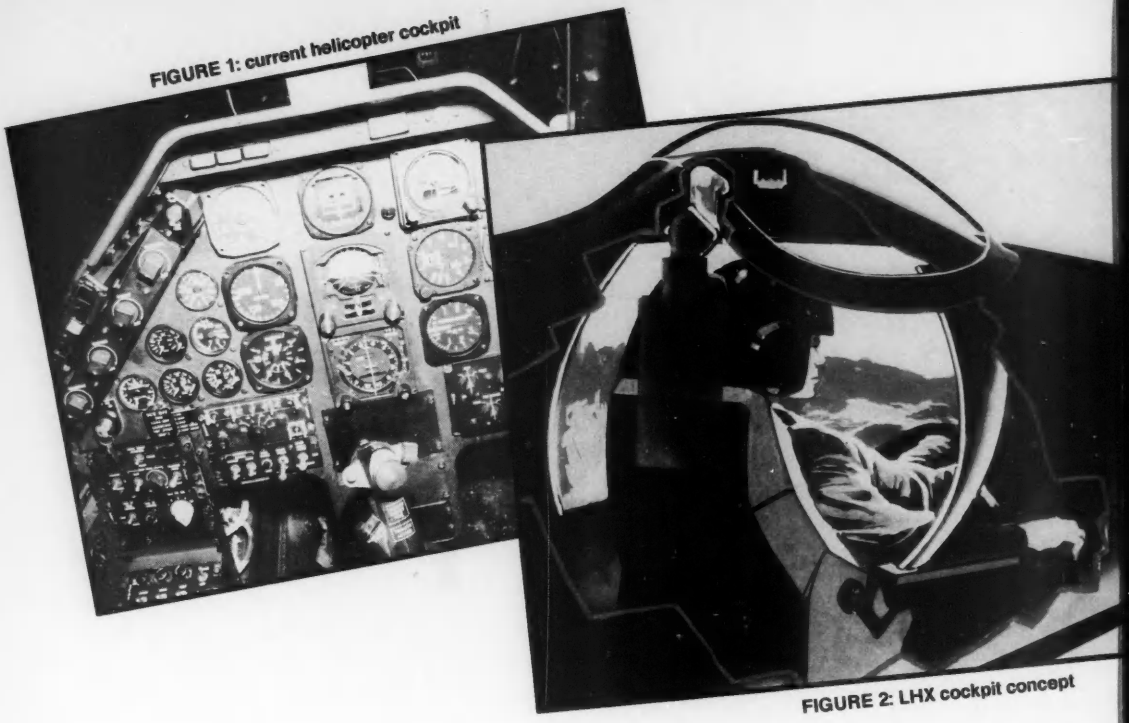


FIGURE 1: current helicopter cockpit

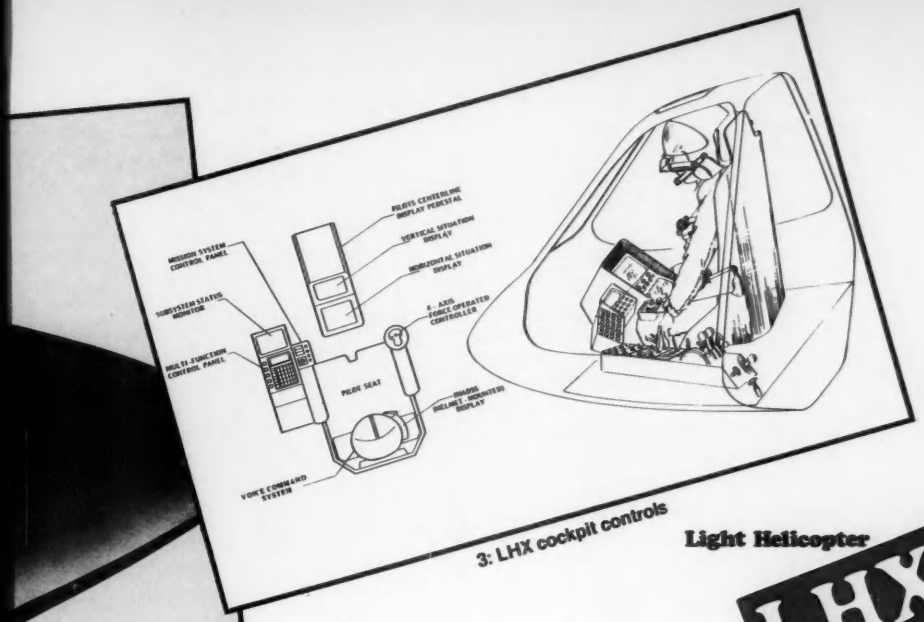
FIGURE 2: LHX cockpit concept

Concepts for LHX Cockpits

Lieutenant Colonel
Russell H. Smith
Materiel Developments Division
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

LHX is the acronym for a family of light, highly capable helicopters intended for operational use in the AirLand Battle well beyond the year 2000. They will be capable of operation in a wide variety of adverse environments on a very hostile battlefield (lasers and other directed energy weapons will be commonplace). So, the conceptual designs being considered are very different from today's helicopters. One major thrust is toward automation of crew duties, with a goal of achieving single-pilot operation.

The cockpit concept for LHX is to mechanize the design so that intelligent systems either operate automatically or in response to simple voice commands or minimal manual inputs to controls grouped within the envelope of the pilot's seat. The key feature in the design will be a large field of view panoramic display of the outside scene. No, the pilot does not look outside. The display will be automatically annotated with aircraft system and battlefield information. The pilot will be able to overlay magnified views of selected terrain and digital map/navigation information or air-



3: LHX cockpit controls

Light Helicopter Family

LHX

craft systems monitoring information. This display will contain all the information necessary to fly the helicopter, acquire and identify targets and monitor onboard systems. With sensor fusion (coupling of infrared, TV and millimeter wave radar into one composite scene) and image generation, the display could remain undistorted for operation in any atmospheric environment within the flying capabilities of the aircraft. To further aid in reducing pilot workload, a new design for flight controls is being developed.

The approach being taken for LHX flight controls is to use a four-axis side arm controller combined with a very sophisticated automatic pilot (above right). Positioned on the arm rest, the flight control will have less than one-half inch of full travel in any direction. Pilot input for forward, rear and turning flight will be as with today's cyclic control. What is today's collective input will be a vertical input to the side arm controller. Hovering pedal turns will be generated by a twisting motion of the controller. The automatic pilot will fly a predetermined flight path at any given altitude above the terrain, allowing the pilot to devote his attention to fire control, battlefield management or other tasks.

To explain the conceptual designs, let's look at a typical mission using the proposed systems.

At the start, the pilot will receive a small cassette which has been programed with operational information including the enemy and friendly situation, map of the operational area with navigation waypoints, communications frequencies and codes and the pilot's voice template. The pilot will insert the cassette into the cockpit console which will activate the voice interactive and keyboard systems. The pilot then can command all systems to automatically energize and check for malfunctions. The aircraft engine will be started through voice or keyboard command, and operational checklists will be called up for display if necessary. The maintenance management system will record system operational parameters for later recall by maintenance people. Pilot cautions and warnings will be automatically displayed, but normal operational information will be displayed only on command. Control of operating modes for fire control, communications and automatic flight controls would be effected by using either the voice or keyboard system.

The navigation system coupled to the autopilot will automatically fly the aircraft over the predetermined flight path. Once in the battle area, the LHX could be commanded to automatically hover while contact is made with supported units and intelligence sources. The pilot could fly to a target engagement area and command the aircraft to automatically unmask, acquire targets and remask. The onboard computer will automatically select and prioritize the threat weapons for engagement and

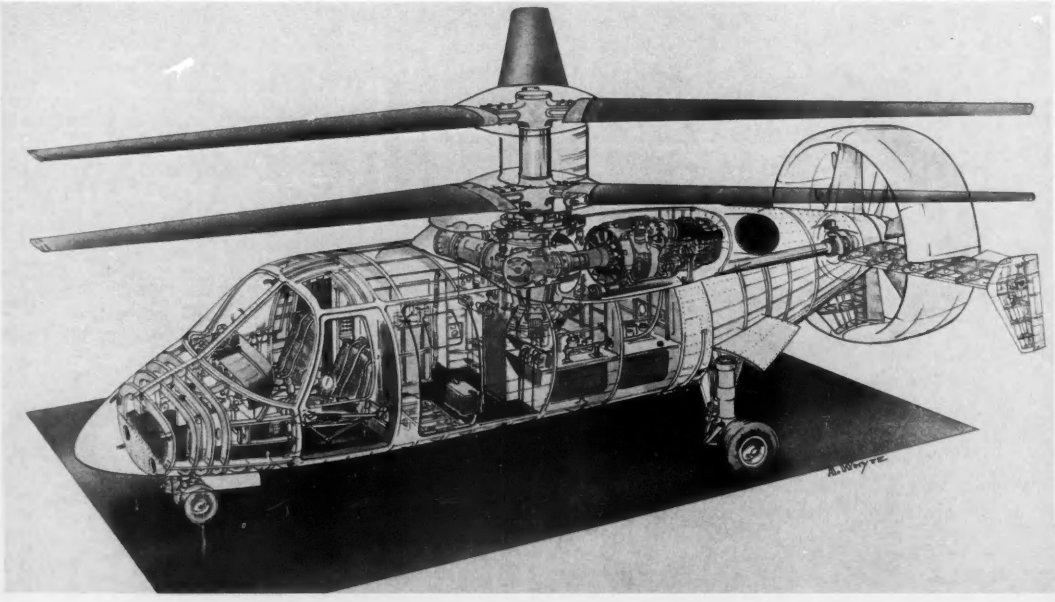
display the information for the pilot. Depending on the mission, the pilot could either engage the targets or transmit the data to other members of the combined arms team. By virtue of its low visibility design and terrain masking, the LHX could operate nearly covertly while penetrating well into enemy-held terrain. One other factor still remains to be considered—the maintenance of the sophisticated systems.

The LHX concept is being formulated with maximum pilot and maintenance technician workload reduction as key elements in the system's architecture. To achieve the high dependability necessary for sustained tactical operations, a robust avionics architecture is being developed. Highly reliable, very high speed, integrated processors (10,000 hours mean time between failure), employing self-fixing electronic rerouting of data through multiple processors, will be used throughout the LHX. Functional system backup will be provided for mission-critical systems through the use of electronically reconfigurable system arrangements without the high cost and weight of traditional duplicative redundancy. The avionics system may make 100-hour continuous deployments with no electrical component maintenance achievable. Simple removal and plug-in replacement of components is envisioned with nonoperable components being discarded instead of repaired. These designs will help meet the needs for reduced manpower to fight and win on the battlefields of the future.

Some of you are thinking, "This guy watched 'Star Wars' too many times." Let me assure you that all of the capabilities are possible by the late 1980s. As part of the LHX concept design, the U. S. Army Aviation Research and Development Command has contracted with Boeing-Vertol to investigate the one-man cockpit concept. As part of the program, Boeing has built a simulator which has the side arm controller and panoramic view display using televisions. Army pilots from field units have flown the simulator through typical nap-of-the-earth (NOE) flight profiles and have praised the handling qualities of the side arm controller. They claim the panoramic view is far easier to fly than using night vision goggles. As a matter of fact, a nonrated member of the Director of Combat Development's staff flew the simulator through the same NOE course without incident after only 10 minutes of instruction.

Of course, a great deal of development is still required, but we are planning on engineering models of the LHX to be flying before the mid-1990s.

We are developing the tactical concepts for the future in the form of AirLand Battle 2000. In order to employ the tactics, we must begin now to develop the technical concepts that will ensure our aircraft are not only lethal but also able to survive in future battles. Old aircraft designs have served us well, but they will not meet the needs of the AirLand Battle of tomorrow.



U.S. Army Communications Command
ATC ACTION LINE

Violations of Federal Aviation Regulations (FARs)

Mr. Jesse M. Burch Jr.
U.S. Army Air Traffic Control Activity
Aeronautical Services Office
Cameron Station, Alexandria, VA

BEGINNING IN about the middle of 1979 there was a tremendous upsurge in the number of FAR violations by Army personnel. Previously, one a year (perhaps) reached Department of the Army level; but, since then about one every 3 weeks is received.

The primary reason for this sudden upsurge is the increased emphasis by the Federal Aviation Administration and a change made by FAA in the method of processing. Before, alleged violations were usually resolved at the local level by the Department of the Army Regional Representative (DARR) to the FAA region in which the incident occurred. Now they are forwarded from the FAA Regional Counsel Office to the designated DA point of contact.

Another reason for the upsurge is that for some reason Army personnel are just committing more violations than before. Whether this is caused by lack of knowledge of FARs, inadequate training, lack of command emphasis, carelessness, a combination of two or more of these or for some other reasons, is not known. What is known is that the number of violations has increased and the Army's once enviable reputation is now slightly tarnished. FAR violations by Army people can generally be grouped into three categories:

- **Penetration of controlled airspace without a proper clearance.** This is the most frequent violation. Reasons given for this violation usually are inability to contact the air traffic control facility, or not being aware of entering a control zone.
- **Public demonstrations.** This category is second in frequency and is not limited to aviators. Violations also have been given to people involved in parachute operations. Causes include improper coordination of the demonstration, flight over unauthorized routes or too close to people and property on the ground, hazardous maneuvering by both aircraft and parachutists, and landing in the wrong area. Usually, this violation occurs when planners or participants in a demonstration misunderstand or are not familiar with appropriate FARs.
- **Entering IMC (instrument meterological conditions) while on a nontactical VFR flight.** This is a violation that should *never* occur, but unfortunately it sometimes does. It results from being IMC in controlled airspace without an IFR (instrument flight rules) clearance. In this case, the transponder should be set to the emergency code and an attempt made at the lowest safe altitude at which communications can be established with an ATC facility to obtain an IFR clearance. *Do not compound the situation by climbing through several IFR altitudes before contacting an ATC facility.* After you are safely on the ground, ask yourself why you were caught in a situation like this. Commanders should also ask this question. It is the responsibility of each Army aviator to be familiar with all pertinent regulations, directives, publications and procedures applicable to him. Within the confines of the National Airspace System the FARs apply and will be abided by except when:
  - Operating in an active Special Use Airspace Area specifically designated for the type of activity being conducted.
  - Operating in accordance with specific waivers granted by FAA.
  - Operating in accordance with specific procedures mutually developed and agreed to by the Army and FAA.
  - Operating under an exemption granted by the Administrator, FAA.
  - The Army, by appropriate authority, exempts itself in accordance with Section 307 (f) of the FAA Act of 1958.

Should you violate or think you have violated an FAR, you should:

- Notify your immediate commander. This will keep him from being surprised later. It also will enable him to initiate an early investigation.
- Notify the DARR to the FAA region in which the violation occurred. Early notification may enable him to resolve the matter at the local level.

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

U.S. GOVERNMENT PRINTING OFFICE: 1982—646-031/10

A LETTER HOME

Dear Dad,

You asked about the dangers of flying and the number of mishaps that occur over here that result in fatal injuries. Relatively few of our craft are destroyed by enemy action. I would say that complacency or a false sense of adequacy causes more crashes than any other factor. Aviators attempt unauthorized maneuvers, run out of fuel, become disoriented or lost, fly low level and crash into obstacles or attempt takeoffs or landings that are not within the capability of their aircraft. The craft that we fly are relatively safe and in most cases prior planning and professional competence normally result in a safe landing if a mechanical malfunction occurs. The loss of aircraft to the enemy is accepted risk and is the nature of war, but at times it's difficult to understand why, with the inherent risks of combat always present, our aviators make such stupid, that is the only way to describe them, stupid mistakes. I imagine that as long as man experiences the exhilaration and the freedom of flight, and the need to foolishly exhibit his manhood and mastery of his machine, accidents will continue. A competent aviator must realize both his own and his aircraft's capabilities and limitations, especially in a combat situation. A loss of an aircraft, whether by enemy action or by accident, is still a loss to our cause.

To better answer your question, no, it is not dangerous to fly; our machines are adequate. It is the human who is dangerous.

The above letter was written 65 years ago, in the spring of 1918 by an American aviator flying in France. Doesn't it make all of us professional aviators proud to realize that we don't make the same STUPID mistakes today?